#1

A STRUCTURE OF ONTARIO AGRICULTURE AS RELATED TO HEALTH AND SAFETY

A BACKGROUND PAPER PREPARED

BY

DR. EARL HASLETT

FOR

THE ONTARIO TASK FORCE ON HEALTH AND SAFETY IN AGRICULTURE

434 UNIVERSITY AVENUE

TORONTO, ONTARIO M7A 1T7

MARCH, 1984

A STRUCTURE OF ONTARIO AGRICULTURE
AS RELATED TO
HEALTH AND SAFETY

A BACKGROUND PAPER PREPARED

BY

DR. EARL HASLETT

FOR

THE ONTARIO TASK FORCE ON HEALTH AND SAFETY IN AGRICULTURE

434 UNIVERSITY AVENUE

TORONTO, ONTARIO M7A 1T7

MARCH, 1984

A STRUCTURE OF ONTARIO AGRICULTURE AS RELATED TO HEALTH AND SAFETY

CONTENTS

ACKNOWLEDGEMENTS

Many people contributed to this study. Appreciation is expressed to John Kinley, Ontario Ministry of Labour for advice and assistance. The following people also gave generously of their time, knowledge and resources:

- Larry Swinn, Ontario Farm Safety Association Inc.
- Peter Lewycky, Ontario Ministry of Labour
- R. Burroughs, M. Levine, P. Granger, B. Houle, V. Lachatelle and K. Bennett of Statistics Canada
- J. Ebbs, T. Danko, J. Frank, Office of the Chief Coroner, Ministry of the Solicitor General
- H. Austrums, Registrar-General, Ministry of Consumer and Commercial Relations
- N. Roller, M. Hurst and W. McGee, Ontario Ministry of Agriculture and Food
- C. Orlowski, Ontario Ministry of Transportation and Communications

INTRODUCTION

The Ontario Task Force on Health and Safety in Agriculture was appointed by Ontario Labour Minister Russell H. Ramsay and Ontario Agriculture and Food Minister Dennis Timbrell. The Task Force was assigned the responsibility to study the need for protecting the occupational health and safety of people who work in agriculture.

Specific terms of reference for the Task Force were:

1. The Task Force is established by the Minister of Agriculture and Food and the Minister of Labour of the Province of Ontario and its members will be appointed by documents signed by both Ministers.

2. The Task Force is constituted to carry out the task defined in these terms of reference and will cease to exist when that task is completed.

3. The function of the Task Force will be to investigate and report on the need for protection of the health and safety of farmers, farm workers and members of farm families engaged in farm work. Among the matters the Task Force will consider are:

   - the nature of occupational health and safety hazards in agriculture;

   - where the need for protection exists, that is, what occupations, farm work activities and types of farming;

   - how the occupational health and safety experiences of persons engaged in on-farm work vary by age, form of attachment to the industry, length of service and other relevant personal variables;

   - the problems of defining a farming operation and a farm workplace;

   - mechanisms for providing protection against health and safety hazards in farm work; and,

   - if the conclusion is that legislation is required, the areas to be addressed

4. The Task Force will present its findings to the Ministers of Agriculture and Food and of Labour, in a fully documented final report and, as deemed appropriate, interim reports will be made to a joint steering committee of officials drawn from both Ministries.

Purpose of the Study

The task force began by a review of available information and decided to develop and implement a research program. As one part of the research program a study was commissioned on the structure of agriculture as related to health and safety.

The purpose of the study was to develop a structural description of Ontario agriculture that could be used by the Ontario Task Force on Health and Safety in Agriculture as an aid to discussions and decisions in the area of health and safety.

Objectives of the Study

Objectives of the study were:

1. To develop an industry structure for agriculture that could be used in health and safety matters.

2. To identify health and safety factors that were particularly relevant in agriculture.

3. To compile information on relevant health and safety factors in a format that fitted in with the industry structure that was developed.

4. To identify, in a general way, the relationships between farm population, farm labour force, employment in agriculture, types of agriculture across Ontario, and experience in health and safety.

Scope of the Study

The scope of the study included decisions that:

1. The study was to deal with health and safety matters at the farm level only — i.e., for purposes of this study agriculture basically was defined as the work of

cultivating the soil, producing crops, and raising livestock.

2. The study was to use quantitative data as much as possible, but qualitative data were to be used where appropriate.

3. An important part of the study was to be the collection and analysis of socio-economic data, but the study was not to be an exhaustive socio-economic effort.

4. The emphasis was to be on current data, but historical data were to be used where appropriate.

5. Safety aspects (fatalities and lost time injuries) were to receive priority as the more ambiguous health aspects could not be investigated in a meaningful way within the context of the study.

Study Procedure

The first stage of the study was to develop a structure for Ontario agriculture that would provide a simple picture of a complex industry. The structure had to include information about farm numbers and farm size. In addition an understanding had to be derived of the farm population, the labour force, and people engaged in agriculture so that some idea could be obtained of the number of people at risk of death or injury. Exposure to risk has changed through time as farm technology changed and more use was made of machinery and chemicals. Therefore data were collected on inputs of machinery and chemicals — both historical and current data.

In essence the structure of agriculture was to be viewed as an interrelationship of:

1. the land base within farm boundaries;

2. the total farm population;

3. the part of the farm population employed in farm operations, and extra hired labour; and

4. the use of technology (especially machinery and chemicals) in farm production.

The second stage of the study was to collect information on fatalities and lost time injuries and attempt to relate such material to the farm structure. Information available on accidents included some published material and also some information in administrative files of Ontario Government Ministries. A collection of data from various sources provided some knowledge about accidents, but the data from one source usually could not be compared readily with data from other sources. This was because the purpose for collecting data was different in each agency and uniformity was lacking in the process of collecting, coding and analyzing data.

In analyzing the number of deaths and injuries in agriculture there were several aspects to be considered. Among these were:

- the necessity to establish the number of fatalities and injuries;

- the necessity to examine factors that may have been relevant in explaining the number of accidents;

- the necessity to evaluate the incidence of deaths and injuries in agriculture in relation to other standards, whether of time or place, another industry, or occurrences per 100,000 of population.

The characteristics of agriculture made it difficult to deal adequately with any of the three aspects mentioned. Agriculture is a complex industry in terms of output mix, geographic factors, and resources used. The farm is a place of business and a place to live, unlike most other industries and occupations. People living on the farm are subject to risks of death and injury within the farm boundary while going about the business of farming and while not engaged in farm work. In addition there are the risks encountered when leaving the farm for business or non-business purposes.

This complexity makes it very difficult to collect statistics on fatalities and injuries in agriculture and even more difficult to evaluate such data when collected. There was no accurate measure of the number of people at risk on farms from purely agricultural activities, mainly because the agricultural population, labour force, and employment in agriculture can not be as easily defined and counted as in other industries. The result was that most work done in the farm accident area focussed, of necessity, on the number of occurrences and related current occurrences to historical occurrences. There was a dearth of specialized studies on factors that may be relevant in explaining the incidence of accidents in terms of severity or factors involved.

Farm Safety Data in Ontario Since 1959

In 1959-1960, The Ontario Department of Agriculture conducted a Farm Accident Survey because of increasing concern about farm accident rates [1]. The report contained, in part, the following message from the then Minister of Agriculture, Hon. W.A. Goodfellow:

> During the past decade Ontario's agricultural industry has witnessed an unprecedented trend toward mechanization. While mechanical aids have lightened many farm tasks and have improved our way of living, there is abundant indication that too high a price is being paid in human life and injury.
>
> It was the ever-increasing loss of life and injury that inspired this study. It is a study that reveals an appalling story of death, hurt and economic loss. It is a story that I hope will leave an indelible impression on the minds of our farm people for it is only through complete awareness of the seriousness of the situation that we can begin to combat the toll of the past few years.

The survey collected fatality and injury data on Ontario's farm population in a one year time period. The results revealed a death and injury toll that was believed to be excessive (Table 1). Fatalities on the farm property (excluding the house) were 84 in number. Slightly over one half of total fatalities of farm people were related to traffic accidents.

After completion of the survey, a farm safety specialist was appointed by the Department and a Farm Safety Council of Ontario was established to encourage the work of local safety councils and act as a co-ordinating body. Since 1959 farm safety topics have been emphasised by the Ontario Government (particularly the Ministries of Labour and Agriculture and Food), agricultural organizations, and the Farm Safety Association Inc. of Guelph. The Farm Safety Association, sponsored by the Workers' Compensation Board of Ontario, has a membership of any agricultural employer or own account farmer who pays assessments to the Workers' Compensation Board. [2]. The Association obtains data on farm injuries from the Workers' Compensation Board and analyzes the data to determine trends and relationships. In addition the Association attempts to compile estimates of agriculturally related fatalities by collecting data from the Workers' Compensation Board, newspapers, the Ontario Provincial Police, and extensive contacts in the agricultural community. An intensive education campaign on farm safety is part of the Association's efforts.

Table 1

Place and Severity of Accidents Involving Ontario's Farm Population March 1, 1959 to February 29, 1960

Place of Accident	Deaths	Injuries		Work-Days Lost
		Permanent	Temporary	
			- number -	
In and Around The Home	31	63	1,135	19,406
Field Accidents	50	110	1,347	31,551
Farm Buildings	34	105	1,859	35,040
Traffic	151	35	1,127	20,957
Other Off-Farm	27	23	400	5,539
Total	293	336	5,868	112,493

Source: Ontario Department of Agriculture, Ontario Farm Accident Survey, 1960.

Note: In and around the home fatal accidents included three in the yards and gardens.

Since 1959 few efforts have been made to understand farm accidents in terms of the factors important to the occurrence of the accident. Attention needs to be directed to relationships as well as to incidence of accidents. Some epidemiologists, members of the branch of medicine concerned with health problems of populations, have begun to turn their attention to farm accidents, although little has been done in Ontario. Mitchell Howard Baker, in his thesis An Exploratory Inquiry into Farm Accidents/Injuries in Ontario, uses an epidemiological approach to provide "general observations concerning the relationship of accident/injury involvement to basic characteristics of the farming population" (3). The analysis was based on replies from 357 respondents. Facts were collected in relation to the person injured, the place of accident and the time of accident. The analysis allowed the author to present conclusions in terms of the epidemiological triad (host, agent, environment).

Baker's summary and conclusions, in an abbreviated form, were:

A. Risk factors and the "Host":

1. There was an association between inexperience and involvement in an accident.

2. There was as association between a history of family involvement (learned bad habits) in accidents and the incidence of accidents.

3. There was an association between a change in work patterns and involvement in an accident.

4. The relationship between experience with a particular piece of equipment and farming experience should be investigated as unfamiliarity with such equipment probably increases risk.

5. The relationship between chronic illness and accidents requires evaluation as risk increased for subjects with chronic conditions, and the risk was greater if the illness was major rather than minor.

B. Risk Factors and the "Agent":

1. There was a distinct tendency to remove safety shields and not replace them, despite the beneficial aspects of shields. Legislation is required to correct this situation.

2. The potential risk of injury increased when machinery was borrowed, and increased further if the machinery had never been borrowed before.

C. Risk Factors and the "Environment":

1. A disproportionate number of accidents occurred towards the end of the work day.

2. The risk of being involved in an accident was greater on a small farm (129 acres or less) than on a larger farm.

D. Some Issues for Investigation:

1. More information should be collected on attitudes and opinions of farm people regarding blame for an accident as a majority of people, involved in an accident or with personal knowledge, believed the accident was not the fault of the victim.

2. The relationship between off-farm work and accidents should be investigated.

3. The use of alcohol, and the failure to take medication, should be investigated.

E. Variables With Different Patterns For Employers and Employees:

1. Employers had 48 percent of injuries classified as serious compared to 21 percent for employees.

2. Employers had more time off work from injuries.

3. The month of highest frequency for injuries was December for employers and July for employees.

F. Employer and Employee Involvement in Accidents:

Baker's study found no systematic association between involvement in accidents and whether the victim was employer or employee.

Recently there has been some interest in very specific studies that look at health problems in some parts of agriculture. The Ontario Pork Producers Marketing Board had a study done on human hearing problems connected with hog operations and a report is expected soon. Susan Pfeiffer and others examined aspects of physical fitness and health on dairy farms in Wellington County [4]. As these studies increase in number there will be an increase in awareness of the health problems affecting farm people, and an appreciation not only of the number of farm accidents and health problems but of the factors related to the accidents and health problems.

TYPES OF AGRICULTURE IN THE DISTRICTS OF ONTARIO

Ontario agriculture is complex in both its production and marketing aspects. At the farm production level this complexity is seen in the diversity of production because of differences in soil, climate and markets. Diversity manifests itself in the production of many commodities, the existence of many types of farms, and regional differences in resources, inputs and outputs. Any realistic picture of Ontario's agriculture takes into account the many types of farms and the pattern of farm types in the five Districts of Ontario (see Figure 1 for a District Map).

There were 82,448 census farms in Ontario in 1981. Statistics Canada, in the 1981 Census of Agriculture, Ontario, published data on 12 farm types. Each census farm was classified according to its predominant production product. For example a farm, where 51 percent of total farm sales were dairy products, was classified as a dairy farm.

Statistics Canada provided data, for the purposes of this study, on 22 farm types and the information was supplied by Districts.

The Southern District contained 27,975 farms, 33.9 percent of Ontario's total (Table 2). This area produced a large proportion (42.1 percent) of Ontario's agricultural output, as measured in dollar terms, reflecting the intensity of production because the area only had 27.3 percent of the farm acreage. Intensity of production was high in the Western District also as an area with 29.4 percent of the farm acreage produced 35.8 percent of output.

Farm size, in acreage terms, increased as one moved east and north. Average farm acreage size by District was as follows:

Southern District	—	146 acres per farm
Central District	—	187 acres per farm
Eastern District	—	221 acres per farm
Northern District	—	327 acres per farm
Ontario average	—	181 acres per farm

The Southern District average was low because a large proportion (46.1 percent) of its farms were under 70 acres (Table 3). However, when farm size was examined in terms of product sales the Southern District farms were slightly larger than Western District

Figure 1 Districts of Ontario

Table 2

Number and Proportion of Farms, Acreages, and Product Sales By District of Ontario, 1980 and 1981

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Number Farms, 1981	27,975	25,151	12,702	12,905	3,715	82,448
Farm Acreage, 1981	4,079,868	4,395,224	2,379,733	2,851,474	1,216,981	14,923,280
Crop Acreage, 1981	3,285,877	2,879,164	1,129,468	1,279,693	402,462	8,976,664
Value of Product Sales, 1980	1,976,508,579	1,677,725,535	507,528,791	443,572,813	86,333,056	4,691,668,774
			- percent -			
Farms, 1981	33.9	30.5	15.4	15.7	4.5	100.0
Farm Acreage, 1981	27.3	29.4	16.0	19.1	8.2	100.0
Crop Acreage, 1981	36.6	32.1	12.6	14.2	4.5	100.0
Product Sales, 1980	42.1	35.8	10.8	9.5	1.8	100.0

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Table 3

Size of Farms Measured in Acreage and Product Sales By District of Ontario, 1980 and 1981

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Size of Farms, By Acres, 1981:						
Less than 70 acres	10,321	6,031	3,477	2,170	378	22,377
70 - 179 acres	9,982	10,092	4,513	4,578	1,172	30,337
180 - 559 acres	6,917	8,204	4,108	5,389	1,559	26,177
560 acres and over	755	824	604	768	606	3,557
Total	27,975	25,151	12,702	12,905	3,715	82,448
			- percent-			
Less than 70 acres	46.1	27.0	15.5	9.7	1.7	100.0
70 - 179 acres	32.9	33.3	14.9	15.1	3.8	100.0
180 - 559 acres	26.4	31.3	15.7	20.6	6.0	100.0
560 acres and over	21.2	23.2	17.0	21.6	17.0	100.0
Total	33.9	30.5	15.4	15.7	4.5	100.0
			- number -			
Size of Farms, By Product Sales, 1980:						
Less than $25,000	12,925	12,871	8,956	8,740	2,924	46,416
$25,000 - $49,999	4,298	3,714	1,286	1,393	272	10,963
$50,000 and over	10, 752	8,566	2,460	2,772	519	25,069
Total	27,975	25,151	12,702	12,905	3,715	82,448
			- percent -			
Less than $25,000	27.9	27.7	19.3	18.8	6.3	100.00
$25,000 - $49,999	39.2	33.9	11.7	12.7	2.5	100.00
$50,000 and over	42.9	34.2	9.8	11.1	2.1	100.00
Total	33.9	30.5	15.4	15.7	4.5	100.00

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

farms and considerably larger than the other three Districts. Average farm size (measured by farm sales) was as follows:

Southern District	—	$70,653 per farm
Western District	—	$66,706 per farm
Central District	—	$39,957 per farm
Eastern District	—	$34,372 per farm
Northern District	—	$23,239 per farm
Ontario average	—	$56,905 per farm

The high average sales per farm in the Southern and Western Districts were caused by the high proportion of farms in those areas having sales of $50,000 and over.

Differences in intensity of production in the five Districts were illustrated by numbers of types of farms in those areas (Table 4). Comparing Southern and Western Districts first, there was a clear dominance of animal agriculture farms in the Western District whereas the predominance of field and horticultural crop farms in the Southern District was supplemented by a strong animal agriculture. A comparison of the proportion of farms classified as animal or crop in the five Districts was as follows:

Southern District	-	34.7% animal, 62.7% crop
Western District	-	76.6% animal, 21.8% crop
Central District	-	71.3% animal, 25.3% crop
Eastern District	-	82.1% animal, 15.6% crop
Northern District	-	76.3% animal, 20.5% crop
Ontario	-	62.4% animal, 35.0% crop

A classification of farms on the basis of sales (51 percent or more from a product or product group) understated the importance of animal agriculture and overstated crop agriculture. An alternative measure of importance was derived by examining the value

Table 4

Number of Farms, By Farm Type and District - 1981

Type of Farm	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Dairy	2,460	4,100	2,093	3,934	690	13,277
Cattle	3,076	9,339	4,810	4,946	1,603	23,774
Hogs	1,799	2,578	522	421	65	5,385
Poultry	877	835	443	413	176	2,744
Sheep and Goats	264	562	290	270	93	1,479
Livestock Combination	783	1,235	432	336	131	2,917
Horse	260	357	309	156	46	1,128
Other Animal Specialty	197	261	163	120	32	773
Sub-total	9,716	19,267	9,062	10,596	2,836	51,477
Wheat	568	199	169	43	2	981
Small Grain	2,996	1,829	712	619	361	6,517
Oilseed	3,335	61	20	13	2	3,431
Grain Corn	3,329	1,307	658	393	2	5,689
Forage	267	493	394	436	134	1,724
Dry Field Pea and Bean	72	127	5	-	-	204
Tobacco	2,195	11	52	-	-	2,258
Potato	63	89	52	20	48	272
Field Crop Combination	213	37	21	13	24	308
Sub-total	13,038	4,153	2,083	1,537	573	21,384
Fruit	2,262	405	369	151	26	3,213
Vegetable	1,321	398	414	144	51	2,328
Greenhouse Products	719	254	234	120	86	1,413
Nursery	208	141	114	58	24	545
Sub-total	4,510	1,198	1,131	473	187	7,499
Other Combination	711	533	426	299	119	2,088
Total	27,975	25,151	12,702	12,905	3,715	82,448

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

of product sales (Table 5). A comparison of the proportion of product sales derived from animals or crops in the five Districts was as follows:

Southern District	-	44.7% animal, 53.0% crop
Western District	-	83.3% animal, 14.0% crop
Central District	-	72.0% animal, 25.3% crop
Eastern District	-	88.6% animal, 9.7% crop
Northern District	-	87.5% animal, 11.1% crop
Ontario	-	66.4% animal, 31.4% crop

The importance of animal agriculture was reinforced when numbers of farm types by District were examined (Table 4). Cattle farms were most numerous, accounting for 28.8 percent of all farms, and were the largest number in all Districts except the Southern District. Dairy farms were important in all Districts, placing second in four Districts and fifth in the Southern District.

Livestock type farms, in total, were concentrated most heavily in the Western District. That area had 37.4 percent of all livestock farms. In contrast the Southern District was predominant in crop type farms (61 percent) and in fruit farms (70 percent). In some specialized farm types the Southern District almost had a monopoly, with 97.2 percent of all tobacco type farms and 97.2 percent of all oilseed type farms.

Table 5

Value of Product Sales, By Farm Type and District - 1980

Type of Farm	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- millions of dollars -			
Dairy	211.6	323.1	141.9	262.8	43.6	983.0
Cattle	242.6	637.3	123.0	63.8	22.8	1,089.5
Hogs	162.7	187.7	25.7	20.3	1.9	398.3
Poultry	185.3	152.9	42.2	34.5	5.2	420.1
Sheep and Goats	1.8	4.0	1.8	1.2	.4	9.2
Livestock Combination	63.8	66.7	14.0	5.6	1.2	151.3
Horse	8.9	9.8	13.6	2.5	.3	35.1
Other Animal Specialty	6.0	15.7	3.1	2.1	.3	27.2
Sub-total	882.7	1,397.2	365.3	392.8	75.7	3,113.7
Wheat	5.7	2.5	1.4	See Note	.3	See Note	9.9
Small Grain	175.2	58.9	12.3	5.4	3.9	255.7
Oilseed	109.2	1.4	.3	See Note	.3	See Note	111.2
Grain Corn	179.6	82.9	34.6	See Note	17.3	See Note	314.4
Forage	3.4	3.6	2.0	1.7	.6	11.3
Dry Field Pea and Bean	2.7	3.6	—	—	—	6.3
Tobacco	268.4	1.0	7.5	—	—	276.9
Potato	7.7	19.6	1.9	1.6	.8	31.6
Field Crop Combination	19.0	2.3	1.6	.1	.1	23.1
Sub-total	770.9	175.8	61.6	26.5	5.6	1,040.4
Fruit	78.6	14.2	9.6	2.1	.2	104.7
Vegetable	76.5	19.9	22.4	1.3	.3	120.4
Greenhouse Products	91.7	20.4	22.5	10.1	2.6	147.3
Nursery	29.0	15.2	12.1	2.9	.9	60.1
Sub-total	275.8	69.7	66.6	16.4	4.0	432.5
Other Combination	47.1	35.0	14.0	7.8	1.2	105.1
Total	1,976.5	1,677.7	507.5	443.5	86.5	4,691.7

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Note: Data could not be given for some crops in two districts because of Statistics Canada secrecy requirements. The numbers shown for Wheat, Oilseed and Grain Corn between the columns for Eastern Ontario and Northern Ontario are totals for these two regions.

THE FARM POPULATION AND FARM EMPLOYMENT

Introduction

The most difficult part of Ontario agriculture to describe and analyse was the farm population and the farm labour supply. However, some understanding was necessary so that deaths and injuries at the farm level could be related back to some epidemiological population in terms of number of occurrences, type of farm, geographic area and other factors.

The procedure in this chapter will be to look at the farm population, labour supply and employment in terms of:

1. the recent trends in farm population, number of farmers, amount of paid labour, and amount of off-farm work,

2. the present situation in the regions of Ontario and in types of farms regarding the labour supply. This work will form a background for the next chapter where measures will be developed of populations (number of farmers, farm population, etc.) that are exposed to risks, by region and type of farm.

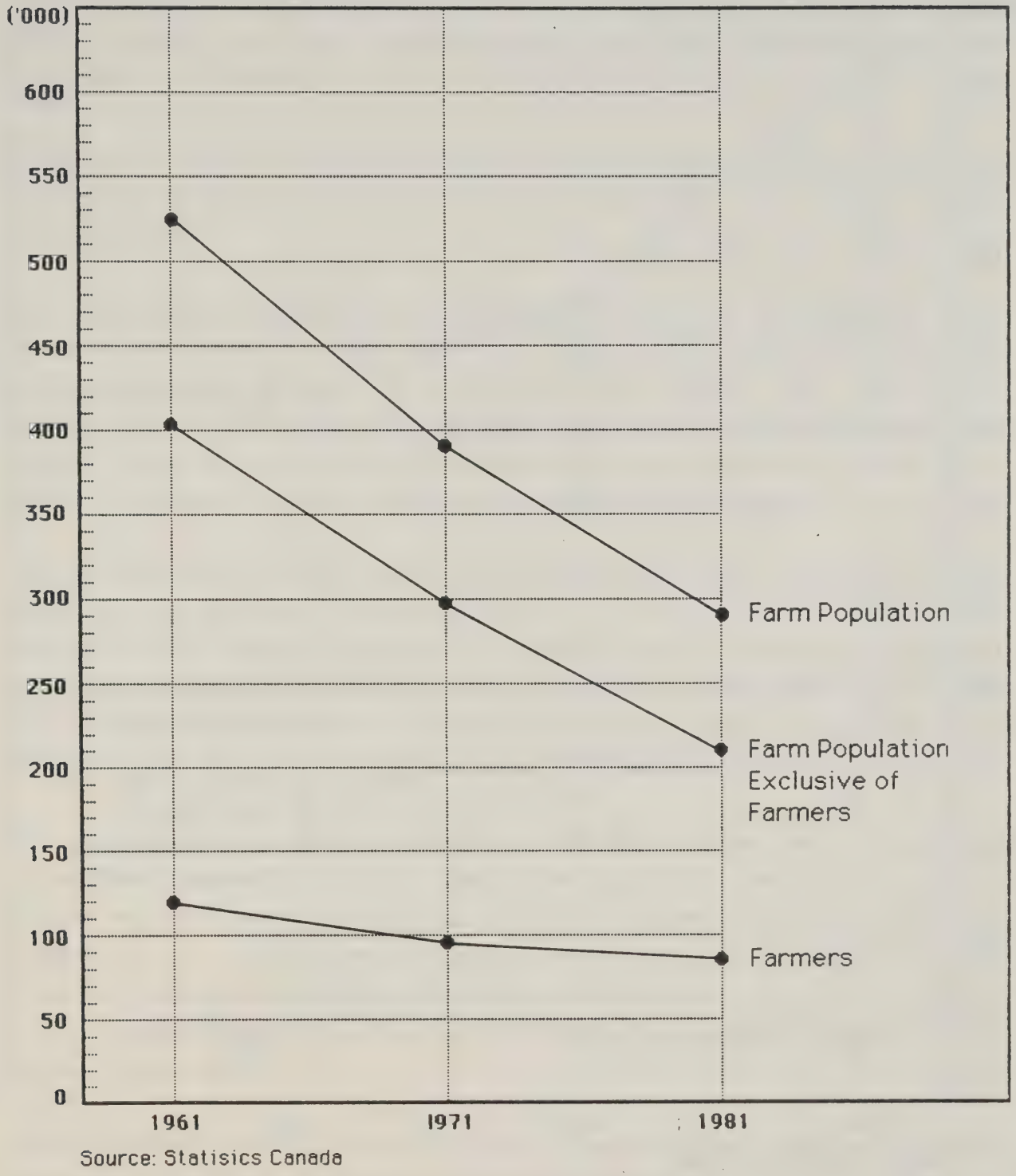
Recent Trends

The farm population changed rapidly in a 20 year time period (Figure 2). The farm population decreased by 25.3 percent from 1961 to 1971 and by a further 26.3 percent from 1971 to 1981. The overall decrease in the 20 year period was 44.9 percent. The number of farmers declined by 21.9 percent in the first ten year period, 13.0 percent in the second, and 32.0 percent in the 20 year period. The number of farmers was showing some signs of levelling out whereas the rate of reduction remained strong in the total farm population. This was reflected in the average size of the farm household, which decreased from 4.32 persons per farm to 3.50 persons in the 20 year period — a large fall of 19.0 percent. Most of the decrease occurred from 1971 to 1981.

Some changes also occurred in the number of farmers reporting paid labour and off-farm work (Figure 3). In the 20 year period the number of farmers reporting off-farm work decreased although the proportion of farmers with off-farm work increased from 35

Figure 2

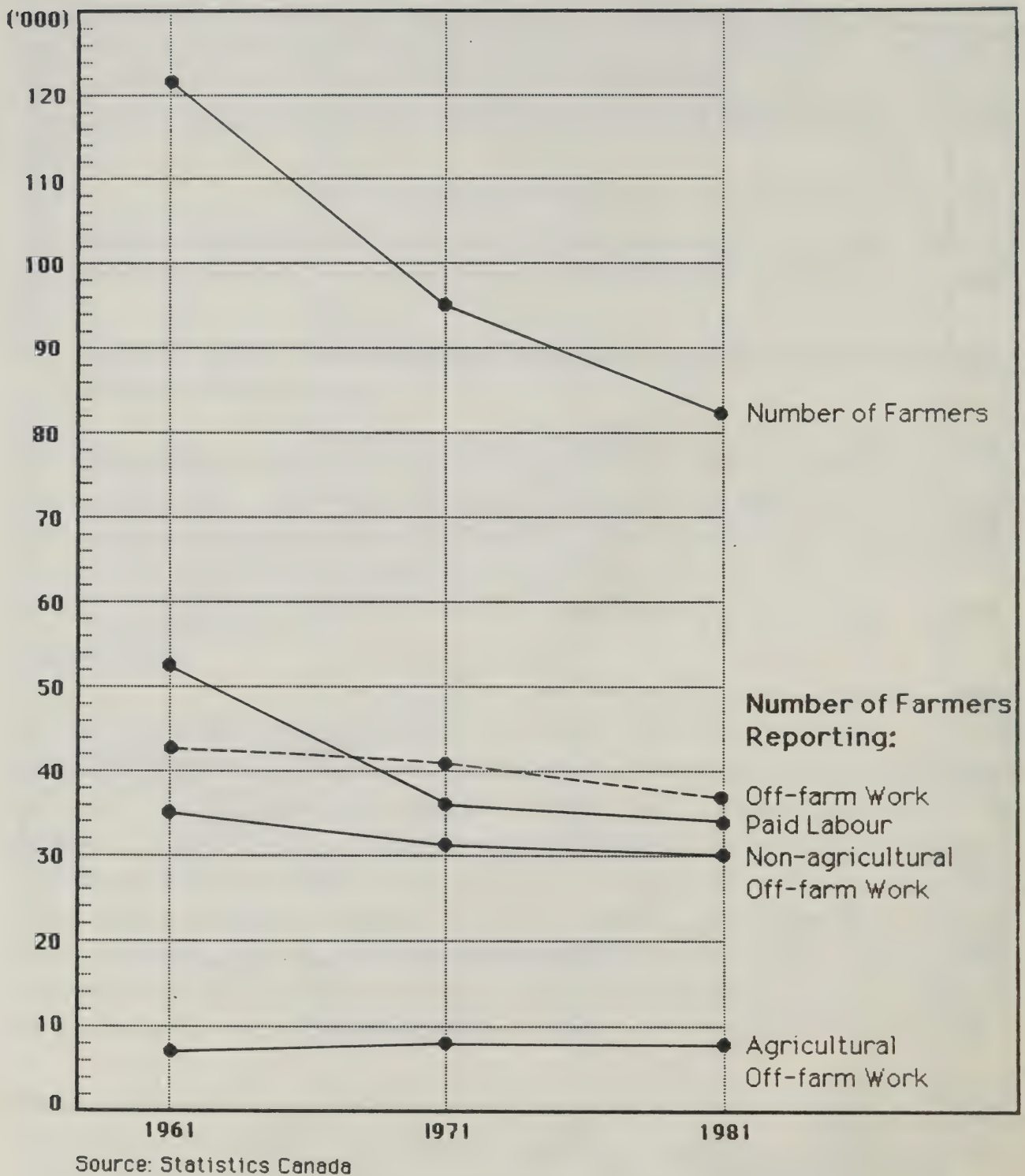
Farm Population and Number of Farmers
Ontario, 1961-1981



Source: Statisics Canada

Figure 3

Number of Farmers, and Farmers Reporting Paid Labour and Off-Farm Work
Ontario, 1961-1981



Source: Statistics Canada

percent to 44 percent as farm numbers decreased much more quickly than the farmers reporting off-farm work. The number of farmers reporting agricultural off-farm work did not change much and by 1981 only ten percent of farmers were in that category.

The number of farmers reporting paid labour decreased substantially, mainly from 1961 to 1971, but in 1981 41.3 percent of farmers still hired labour — compared to 43.2 percent in 1961. More farmers reported seasonal hired labour (32.5 percent) than year round labour (13.0 percent).

These trends, identified from census data, were examined further and from other perspectives by using annual labour force and employment data provided through Statistics Canada.

The Federal Labour Force Survey provided a general picture of the agricultural labour force and employment in Ontario over an 18 year time period (Figure 4 and Table 6). There were specific parts of that picture that were difficult, if not impossible, to explain. For example, sudden and large drops or increases in components of employed labour in a year (1972, 1977, 1979) were so large as to raise some doubt as to accuracy on a year to year basis. However, the trend lines should be fairly accurate.

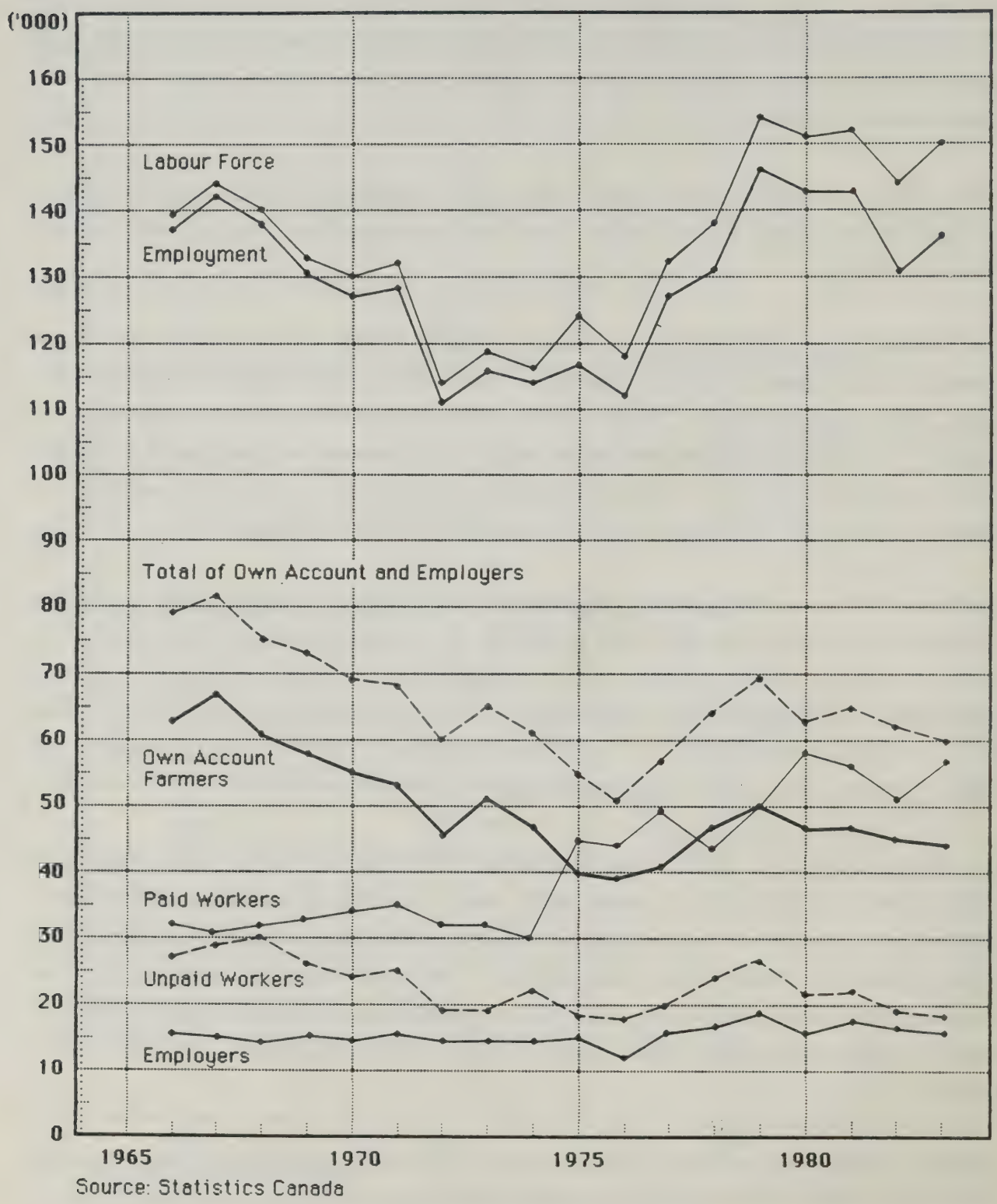
The labour force was composed of the portion of the civilian non-institutional population 15 years of age and over who were employed, or unemployed, during the week when Statistics Canada carried out the survey. According to the results of that survey total employment in the agricultural industry was in decline for a considerable time, bottomed out in 1972 and increased again to a higher level beginning in 1977. Unemployment in the industry (labour force minus employment) began to increase in 1975.

The total employment figures were examined in terms of the four components of employment. Farmers without hired labour were classified as "own account farmers". Farmers with hired labour were known as employers. Workers, other than farmers, were divided into two groups, hired and unpaid. The trend lines for each of the four components explained something about Ontario agriculture in recent years and gave a basis for some understanding about labour force populations in the past, present and near future.

The only stable component was employers, the farmers who needed hired labour because of the size of their operations, or the labour intensive nature of the production process,

Figure 4

Labour Force and Employment Trends in Agriculture
Ontario, 1966–1983



Source: Statistics Canada

Table 6

Ontario's Labour Force and Employment, in the Agricultural Industry, 1966 - 1983

	Labour Force			Employment						
Year	Male	Female	Total	Male	Female	Total	Own Account	Emplo-yers	Paid Workers	Unpaid Worker
				- ooo -						
1966	118	21	139	116	21	137	63	16	32	27
1967	119	25	144	118	25	143	67	15	31	29
1968	115	25	140	113	25	138	61	14	32	30
1969	110	23	133	109	22	131	58	15	33	26
1970	109	21	130	106	21	127	55	14	34	24
1971	110	23	132	107	22	129	53	16	35	25
1972	93	21	114	91	20	111	46	14	32	19
1973	99	20	119	97	20	116	51	14	32	19
1974	94	22	116	93	21	114	47	14	30	22
1975	90	33	124	87	30	117	40	15	45	18
1976	85	33	118	82	30	112	39	12	44	17
1977	95	39	133	90	36	127	41	16	49	20
1978	96	42	138	93	38	131	47	17	43	24
1979	108	46	154	104	42	146	50	19	50	27
1980	102	49	151	98	46	143	47	16	58	22
1981	104	48	152	98	45	143	47	18	56	22
1982	96	48	144	88	43	131	45	17	51	18
1983	99	51	150	90	46	136	44	16	57	18

Sources: 1. Statistics Canada, Labour Force Annual Averages, 1973-1983. Catalogue 71-529.

2. V. Lachatelle, Statistics Canada.

or the need for year round labour. Although size of operations continued to expand the number of employers of hired labour has not increased because technology was available to reduce the need for labour. There were no indications that the number of employers would change very much.

The second component, own account farmers, declined until the mid 1970's and remained relatively stable thereafter. This trend was in line with census figures and reflected the tendency for many farmers (especially small scale producers) to leave the industry. As farm numbers declined rapidly over a fairly long period it was inevitable that a time would come when these numbers would become more stable.

The number of unpaid workers, the third component, tended to decline throughout most of the period. This reflected mainly the decrease in farm numbers, but also some reduction in the number of unpaid workers in each farm household. The reduction in unpaid workers per household may have happened for three reasons, the move to pay more of the farm family, some reduction in number of family at home during the years of an expanding economy and good alternative job opportunities, and a reduced number of family members per farm.

The number of paid workers, the fourth component, moved upward substantially. This increase in paid workers (25,000) was offset by the decrease in own account farmers (19,000) and unpaid workers (9,000). This was a major shift in the source of farm labour, with important implications for the agricultural industry generally, and of very specific interest to people concerned with health and safety matters in agriculture.

The sex composition of the labour force and employed people changed over the period examined. Male membership in the labour force and in employment decreased while female numbers rose steadily. The female proportion of both the total labour force and employed people went from about 16 percent to 33 percent. Less than five percent of farm operators (own account, plus employers, plus the incorporated operations that were counted among paid workers in the Labour Force Survey) were female in the 1981 census. Therefore about 42,000 female workers were employed as paid or unpaid workers, making up 56 percent of those two categories of workers. Females likely made up a very high percentage of unpaid workers as there was an increasng tendency for male family members to be paid if they were fairly active participants in farm operations.

Present Situation Regarding Paid Labour

Farmer reliance on paid labour was higher in the Southern District than in the other four districts (Table 7). That district, with 33.9 percent of Ontario's farmers, contained 38.2 percent of the Province's farmers who reported paid labour (see Appendix Tables 1 and 2 for details on paid labour). Southern District farmers used more seasonal labour than year round labour. In contrast all other districts used more year round labour. On balance the total Ontario use of the two types of labour was about the same.

The Southern District had almost half the total paid labour while having only one-third of the farmers. This emphasis on paid labour can be illustrated by the proportion of the Southern District's farmers using such labour and the amounts used by farmers reporting paid labour. The proportion of each district's farmers using paid labour was as follows:

Southern District	—	46.4 percent
Western District	—	38.1 percent
Central District	—	40.0 percent
Eastern District	—	40.1 percent
Northern District	—	32.5 percent
Ontario	—	41.3 percent

The number of weeks paid labour, as reported in the Census, was converted to person-year equivalents (using 52 weeks equal one year) to obtain a clearer picture of amounts of paid labour. The average amount of paid labour reported per farm was 1.25 person-years in the Southern District, and this was much higher than the other Districts (Table 8). The Ontario average was almost one person-year.

The Southern District led in amount of paid labour per farm for farms employing either year round labour or seasonal labour. However, the disparity between that District and other Districts was greater in the case of seasonal labour.

Employment of paid labour for farm types was examined in terms of number of farmers employing labour, proportion of farmers employing labour, and the amount employed.

Animal type farms were most numerous in hiring labour and were important purchasers of labour in all Districts of Ontario (Table 9). Field crop type farms were the most numerous employers in the Southern District, but were not prominent elsewhere.

Table 7

Paid Labour on Ontario Farms
By District - 1980

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
Number:						
Number of Farms	27,975	25,151	12,702	12,905	3,715	82,448
Number Farms Reporting Paid Labour	12,988	9,578	5,075	5,173	1,209	34,023
Number Farms Reporting Year Round Labour	3,482	3,386	1,650	1,848	356	10,722
Number Farms Reporting Seasonal Labour	10,783	7,144	4,070	3,857	958	26,812
Total Weeks Paid Labour	844,159	423,789	234,940	184,098	34,192	1,721,178
Total Weeks Year Round Labour	318,451	278,266	128,319	115,418	19,004	859,458
Total Weeks Seasonal Labour	525,708	145,523	106,621	68,680	15,188	861,720
Proportion of Ontario:						
Farms	33.9	30.5	15.4	15.7	4.5	100.0
Farms Reporting Paid Labour	38.2	28.1	14.9	15.2	3.6	100.0
Farms Reporting Year Round Labour	32.5	31.6	15.4	17.2	3.3	100.0
Farms Reporting Seasonal Labour	40.2	26.6	15.2	14.4	3.6	100.0
Weeks Paid Labour	49.1	24.6	13.6	10.7	2.0	100.0
Weeks Year Round Labour	37.1	32.4	14.9	13.4	2.2	100.0
Weeks Seasonal Labour	61.0	16.9	12.4	8.0	1.7	100.0

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Table 8

Number of Person-Year Equivalents of Paid Labour and Average Person-Year Equivalents per Farmer Reporting By District - 1980

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
Number Person-Year Equivalents of Paid Labour	16,233	8,150	4,518	3,542	657	33,100
Average Number Person-Year Equivalents of Paid Labour Per Farmer Reporting Paid Labour	1.25	.85	.89	.68	.54	.97
Average Number Person-Year Equivalents of Year Round Labour Per Farmer Reporting Such Labour	1.76	1.58	1.50	1.20	1.03	1.54
Average Number Person-Year Equivalents of Seasonal Labour Per Farmer Reporting Such Labour	.94	.39	.50	.34	.31	.62

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Table 9

Farmers Reporting Paid Labour, By District and Type of Farm
Ontario - 1980

Type of Farm	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Dairy	1,599	2,332	1,365	2,496	423	8,215
Cattle	1,018	3,249	1,597	1,509	452	7,825
Hogs	628	808	155	117	22	1,730
Poultry	478	379	149	111	30	1,147
Sheep and Goats	44	138	54	66	20	322
Livestock Combination	308	447	138	94	25	1,012
Horse	123	177	169	74	16	559
Other Animal Specialty	63	95	41	31	9	239
Sub-total	4,261	7,625	3,668	4,498	997	21,049
Wheat	97	42	58	10	-	207
Small Grain	1,104	459	200	161	77	2,001
Oilseed	797	15	4	4	-	820
Grain Corn	998	412	238	164	1	1,813
Forage	39	79	53	54	21	246
Dry Field Pea and Bean	17	29	3	-	-	49
Tobacco	2,033	11	48	-	-	2,092
Potato	31	62	15	10	17	135
Field Crop Combination	142	18	12	5	6	183
Sub-total	5,258	1,127	631	408	122	7,546
Fruit	1,584	228	231	69	7	2,119
Vegetable	900	208	214	47	11	1,380
Greenhouse Products	504	139	133	52	31	859
Nursery	135	81	61	28	17	322
Sub-total	3,123	656	639	196	66	4,680
Other Combination	346	170	137	71	24	748
Total	12,988	9,578	5,075	5,173	1,209	34,023

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Horticultural type farms were very significant employers in the Southern District also, accounting for two-thirds of Ontario's horticultural employers.

Sixty-two percent of all farms hiring labour were animal type farms, 22.0 percent were crop farms and 13.8 percent were horticultural (Table 10). Dairy farmers led the way in hiring but cattle producers were close behind. Tobacco producers led the crop group with small grain and grain corn production units fairly close in employer numbers. More fruit growers than vegetable producers employed labour.

The proportion of producers employing labour was very high for tobacco farms (93 percent) and fairly high for fruit farms (66 percent), dairy farms (62 percent), and greenhouse products (61 percent). Horticultural producers were more likely to hire labour than crop or livestock farmers and livestock farmers were more likely to hire than crop producers. All three groups were more likely to hire seasonal labour than year round labour. Animal and horticultural type farms were significant employers of year round labour.

A substantial proportion of dairymen (29 percent), horse farms (28 percent), greenhouse operations (27 percent), nurseries (23 percent), poultry farms (22 percent) and potato farms (21 percent) hired year round labour. Only tobacco farmers (88 percent) and horticultural farms had a high proportion of operators hiring seasonal labour.

The amount of labour hired gave a different perspective (Table 11). In terms of person-year equivalents of hired labour the dairy operations were very prominent with 6269 person-year equivalents, followed by tobacco with 4641. Person-year equivalents were lower than expected for cattle farms. Large quantities of paid labour were found in all horticultural farm types. Animal farm types had 44.2 percent of all paid labour, crop farms 22.9 percent and horticultural operations 27.7 percent as measured in person-years.(Table 10).

Present Situation Regarding Off-Farm Work

Over 36,000 Ontario farmers reported some off-farm work — 44 percent of all farmers (Table 12). Only 8260 reported agricultural off-farm work, equivalent to ten percent of farmers (see Appendix Table 3 for details on off-farm work). Agricultural off-farm work made up only 13 percent of total off-farm labour.

Table 10

Farmers Reporting Paid Labour, By Type of Farm
Ontario - 1980

Type of Farm	Proportion of All Farmers Reporting			Farmers Reporting Paid Labour		Proportion of Total
	Paid Labour	Year-Round Paid Labour	Seasonal Paid Labour	Number	Proportion	Person-Years of Paid Labour
	percent	percent	percent	no.	percent	percent
Dairy	62	29	42	8,215	24.2	18.9
Cattle	33	8	27	7,825	23.0	9.3
Hogs	32	14	21	1,730	5.1	3.7
Poultry	42	22	26	1,147	3.4	6.4
Sheep and Goats	22	4	18	322	1.0	.3
Livestock Combinations	35	12	25	1,012	3.0	2.2
Horse	50	28	32	559	1.6	2.4
Other Animal Specialty	31	13	25	239	.7	1.0
Sub-total	41	15	30	21,049	62.0	44.2
Wheat	21	3	19	207	.6	.2
Small Grain	31	6	26	2,001	5.9	2.8
Oilseed	24	4	20	820	2.4	.8
Grain Corn	32	8	27	1,813	5.3	3.1
Forage	14	3	11	246	.7	.2
Dry Field Pea and Bean	24	5	19	49	.1	—
Tobacco	93	10	88	2,092	6.1	14.0
Potato	50	21	46	135	.4	1.2
Field Crop Combination	59	15	54	183	.5	.6
Sub-total	35	7	31	7,546	22.0	22.9
Fruit	66	11	62	2,119	6.2	9.2
Vegetable	59	10	56	1,380	4.1	6.3
Greenhouse Products	61	27	49	859	2.5	7.8
Nursery	59	23	52	322	1.0	4.5
Sub-total	62	15	57	4,680	13.8	27.8
Other Combination	36	10	29	748	2.2	5.1
Total	41	13	33	34,023	100.0	100.0

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Table 11

Person-Year Equivalents of Paid Labour, By Type of Farm and District of Ontario - 1980

Type of Farm	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Dairy	1,294	1,719	1,025	1,915	316	6,269
Cattle	547	1,350	549	490	136	3,072
Hogs	470	529	98	111	12	1,220
Poultry	739	917	233	184	36	2,109
Sheep and Goats	12	45	12	17	15	101
Livestock Combination	296	257	111	43	7	714
Horse	176	234	321	67	12	810
Other Animal Specialty	46	218	35	39	4	342
Sub-total	3,580	5,269	2,384	2,866	538	14,637
Wheat	28	12	15	1	-	56
Small Grain	621	157	81	49	16	924
Oilseed	242	6	-	1	-	249
Grain Corn	591	186	175	84	1	1,037
Forage	20	26	15	11	3	75
Dry Field Pea and Bean	7	7	-	-	-	14
Tobacco	4,440	20	181	-	-	4,641
Potato	80	254	13	26	12	385
Field Crop Combination	174	17	19	2	1	213
Sub-total	6,203	685	499	174	33	7,594
Fruit	2,152	465	360	52	2	3,031
Vegetable	1,388	260	380	43	4	2,075
Greenhouse Products	1,557	417	413	160	53	2,600
Nursery	735	396	240	84	22	1,477
Sub-total	5,832	1,538	1,393	339	81	9,183
Other Combination	618	658	242	163	5	1,686
Total	16,233	8,150	4,518	3,542	657	33,100

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Table 12

Farmers Reporting Off-Farm Work, Agricultural and Non-Agricultural By District - 1980

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Number of Farms (1981)	27,975	25,151	12,702	12,905	3,715	82,448
Number Farms Reporting Off-Farm Work	11,522	10,859	6.196	5,739	2,090	36,406
Number Farms Reporting Agricultural Off-Farm Work	3,090	2,775	1,090	994	311	8,260
Number Farms Reporting Non-Agricultural Off-Farm Work	9,121	8,747	5,404	5,002	1,909	30,183
Total Days Off-Farm Work	2,176,385	1,942,184	1,220,755	1,115,653	408,837	6,863,814
Total Days Agricultural Off-Farm Work	359,718	279,708	112,698	105,132	28,619	885,875
Total Days Non-Agricultural Off-Farm Work	1,816,667	1,662,476	1,108,057	1,010,521	380,218	5,977,939
			- Proportion of Ontario -			
Farms (1981)	33.9	30.5	15.4	15.7	4.5	100.0
Farms Reporting Off-Farm Work	31.7	29.8	17.0	15.8	5.7	100.0
Farms Reporting Agricultural Off-Farm Work	37.4	33.6	13.2	12.0	3.8	100.0
Farms Reporting Non-Agricultural Off-Farm Work	30.2	29.0	17.8	16.6	6.3	100.0
Days Off-Farm Work	31.7	28.3	17.8	16.2	6.0	100.0
Days Agricultural Off-Farm Work	40.6	31.6	12.7	11.9	3.2	100.0
Days Non-Agricultural Off-Farm Work	30.4	27.8	18.5	16.9	6.4	100.0

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

The proportion of agricultural producers working off-farm varied considerably from area to area and was as follows:

Southern District	—	41.2 percent
Western District	—	43.2 percent
Central District	—	48.8 percent
Eastern District	—	44.5 percent
Northern District	—	56.3 percent
Ontario	—	44.2 percent

The proportion generally increased as one moved from west to east and south to north, although the Central District had a higher proportion than expected. The same geographic pattern was observed in farmers with non-agricultural off-farm work, as the proportion of agricultural producers working off-farm in non-agricultural jobs were:

Southern District	—	32.6 percent
Western District	—	34.8 percent
Central District	—	42.5 percent
Eastern District	—	38.8 percent
Northern District	—	51.4 percent
Ontario	—	36.6 percent

The proportion of producers reporting agricultural off-farm work was highest in the Southern and Western Districts. Proportions were:

Southern District	—	11.0 percent
Western District	—	11.0 percent
Central District	—	8.6 percent
Eastern District	—	7.7 percent
Northern District	—	8.3 percent
Ontario	—	10.0 percent

The contribution of farm operators to agriculture's hired labour force was measured by the number of days of agricultural off-farm work available to each farm in the Districts, and was as follows:

Southern District	—	12.9 days
Western District	—	11.1 days
Central District	—	8.9 days
Eastern District	—	8.1 days
Northern District	—	7.7 days
Ontario	—	10.7 days

As a contrast the reduction in farm operator's labour available to agriculture's hired labour force (or to operators own farm labour force) because of non-agricultural off-farm work was measured by the number of days of non-agricultural off-farm work available to each farm in the Districts. The results were:

Southern District	—	64.9 days
Western District	—	66.1 days
Central District	—	87.2 days
Eastern District	—	78.3 days
Northern District	—	102.3 days
Ontario	—	72.5 days

A conversion of weeks of off-farm work to person-year equivalents by farm type shows that livestock farmers had 12,690 person-years off-farm work — equal to 57.7 percent of all off-farm work (Table 13). One group, cattle producers, had 33.6 percent of the total, and their number of person-years of off-farm work was predominate among the livestock farms in all Districts of Ontario.

Crop farmers had 29.0 percent of all off-farm work, with small grain and grain corn producers accounting for large quantities. Oilseed producers were important in off-farm work in the Southern District. Fruit growers accounted for a large part of off-farm work in the horticultural group.

Table 13

Person-Year Equivalents of Farmers Off-Farm Employment By District of Ontario and Farm Type-1980

Type of Farm	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Dairy	155	241	172	285	64	917
Cattle	874	2,381	1,711	1,807	614	7,387
Hogs	403	646	148	133	25	1,355
Poultry	208	231	156	158	94	847
Sheep and Goats	124	266	131	117	46	684
Livestock Combination	155	245	161	152	62	775
Horse	106	140	120	61	18	445
Other Animal Specialty	76	90	53	44	17	280
Sub-total	2,101	4,240	2,652	2,757	940	12,690
Wheat	237	79	66	18	-	400
Small Grain	701	646	263	249	158	2,017
Oilseed	1,088	22	10	6	1	1,127
Grain Corn	978	429	248	143	-	1,798
Forage	112	182	166	144	56	660
Dry Field Pea and Bean	27	39	2	-	-	68
Tobacco	176	2	2	-	-	180
Potato	7	13	16	5	23	64
Field Crop Combination	31	12	6	5	12	66
Sub-total	3,357	1,424	779	570	250	6,380
Fruit	776	148	132	58	10	1,124
Vegetable	327	122	98	40	20	607
Greenhouse Products	138	52	54	21	28	293
Nursery	65	49	38	24	8	184
Sub-total	1,306	371	322	143	66	2,208
Other Combination	212	190	160	106	54	722
Total	6,976	6,225	3,913	3,576	1,310	22,000

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

POPULATION(S) EXPOSED TO RISK

Introduction

Any attempt to build up a profile of the farm labour force or farm employment must contend with inadequate data, and data that are inconsistent in some cases. However, any evaluation of the risks facing farm people requires some data on the relevant population, or populations. The determination of the farm population that is exposed to any risk, agricultural or non-agricultural, is difficult because:

1. The farm, as a geographic location, is a place of business and a place to live, and family members can be exposed to agricultural risks even when not involved in the farm business.

2. All farmers do not spend all their time at farm work — i.e. among other activities many farmers work off their own farm, either at work on another farm or at non-agricultural work activities.

3. The work time of family members in agriculture is impossible to determine in any precise way. This is true whether family labour is paid or not paid, but it is most difficult to establish the extent of unpaid family labour.

4. The supply of, and demand for, hired labour fluctuates monthly and an important part of the total labour supply is made up of a hired labour force that works on a seasonal basis.

With these limitations in mind a calculation was made of the probable number of people employed in agriculture for three years 1960, 1970, 1980. This number was derived in terms of person-year equivalents. The probable number of person-year equivalents of people employed in agriculture could be used as one figure when relating fatalities and injuries back to some population. No population figures existed that were completely suitable. The numbers of farmers and farm population were known but each figure has limitations. The number of farmers could be regarded as a fairly definite figure but the limitations were that many census farmers spent most of their time in off-farm work, and the number of farmers was not remaining as a constant proportion of the farm population over time. The farm population was also a definite figure, but a large proportion of that population was engaged in off-farm activities or were not working in

agriculture if home because of age or other reasons. Another employment figure was the one published in the Labour Force Survey as a result of the federal monthly labour survey. It was difficult to use as a population exposed to risk because of the fairly large number of seasonal workers involved in the industry. Also it was difficult to reconcile data in the Labour Force Survey with the Census of Agriculture because of differences in objectives, methodology and timing. In brief, no completely suitable population figures existed that could be used to relate to fatalities and injuries. Four different sets existed or could be derived. These were number of farmers, farm population, employment in agriculture, and person-year equivalents of labour used on farms. Each set could be subdivided.

The procedure to derive an estimate of agricultural employment in person-year equivalents was as follows:

1. All census employment data expressed in days or weeks were converted to person-year equivalents (6 days = 1 week, 312 days = 1 year, 52 weeks = 1 year).

2. The time spent by farmers on their own farms was calculated by taking the number of farmers and subtracting the amount of person-year equivalents of time off the farm, whether for agricultural or non-agricultural purposes. Census data were used.

3. Census data were used for hired labour.

4. Unpaid family labour data were obtained for 1970 and 1980 from information published in the monthly Labour Force Survey. The Ontario total was allocated to Districts arbitrarily on the basis of farm numbers. The unpaid family labour data may be over estimated because the agricultural industry information in the Labour Force Survey was based on the Standard Industrial Classification Manual of 1970 and included major group 3 — services incidental to agriculture. These services were partly based on farm and partly off-farm. Unpaid family labour data for 1960 were obtained from the 1961 Census of Agriculture.

5. Using 1980 data as an example the calculations were:

   (a) Total number of census farmers (82,448) minus person-year equivalents of all off-farm work (6,863,814 days divided by 312) equals (82,448 —22,000) 60,448 person-year equivalents of farmers work on their own farms.

(b) Total census weeks of paid labour (1,721,178) divided by 52 weeks per year equals 33,100 person-year equivalents of paid labour.

(c) Unpaid family workers were 22,000 in the Labour Force Survey

(d) 60,448 + 33,100 + 22,000 = 115,548 person-year equivalents.

Calculations

The total of labour employed on Ontario farms was calculated in terms of person-year equivalents and the total was composed of:

- The number of person-year equivalents of farmers time spent working on their own farms.

- The number of person-year equivalents of hired labour.

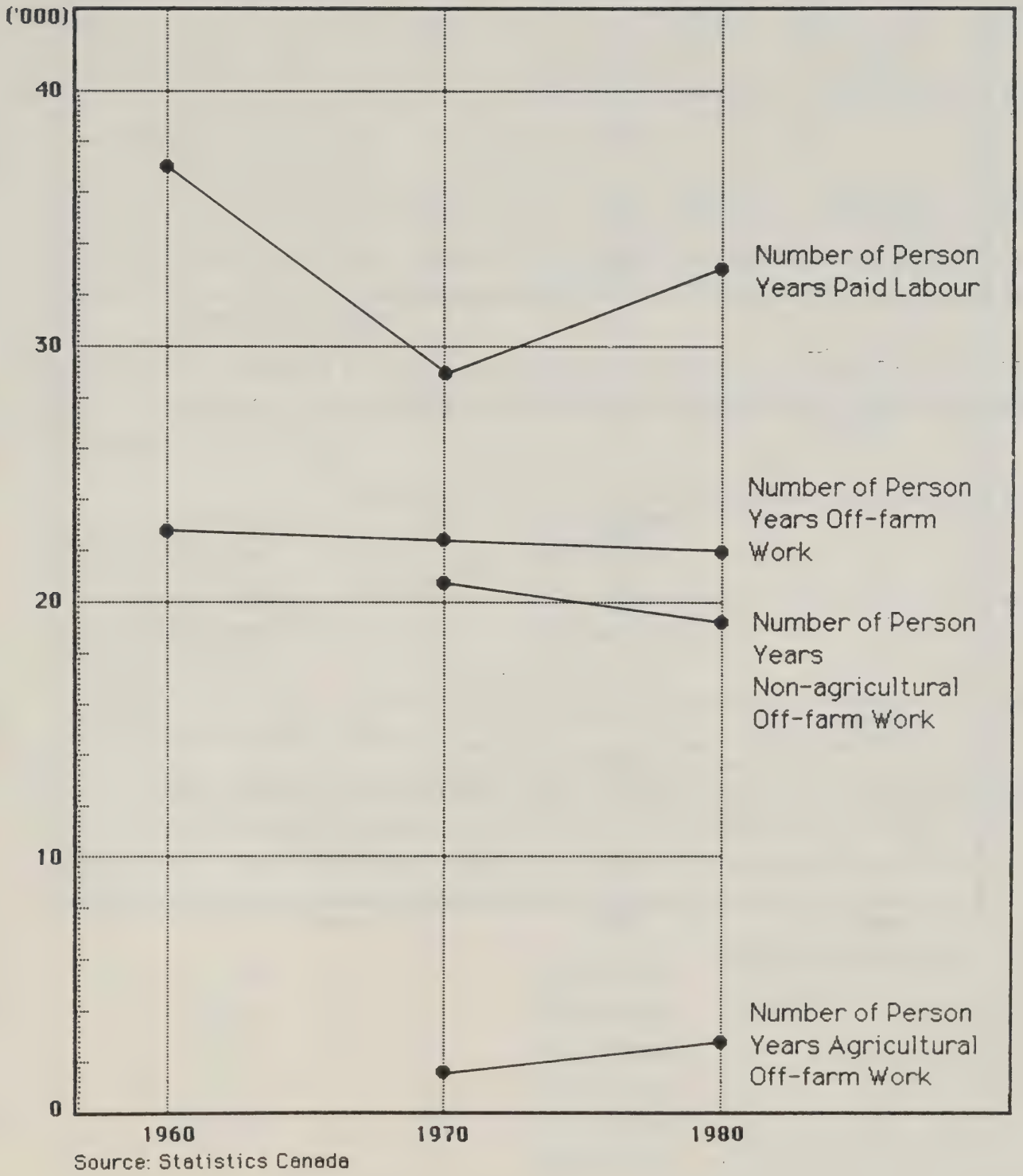
- The number of person-year equivalents of unpaid family labour.

The approximate number of person-year equivalents that farmers spent on their own farm work could be estimated by subtracting the number of person-years of off-farm work from the total number of farmers. The total number of person-year equivalents of off-farm work remained relatively constant from 1960 to 1980, showing only a slight decrease (Figure 5). There was a movement, at least from 1970 to 1980, towards fewer person-years devoted to non-agricultural work and more towards agricultural off-farm work. However, the agricultural part remained small in comparison to the non-agricultural part.

Farmers' labour on their own farms in Ontario decreased fairly steadily from 1960 to 1980 (Figure 6). In contrast the number of person-years of paid labour declined substantially in the first decade, but increased in the next ten years. Unpaid labour declined substantially, although like the farmers labour on their own farm, there was a slower decline in the second decade.

Figure 5

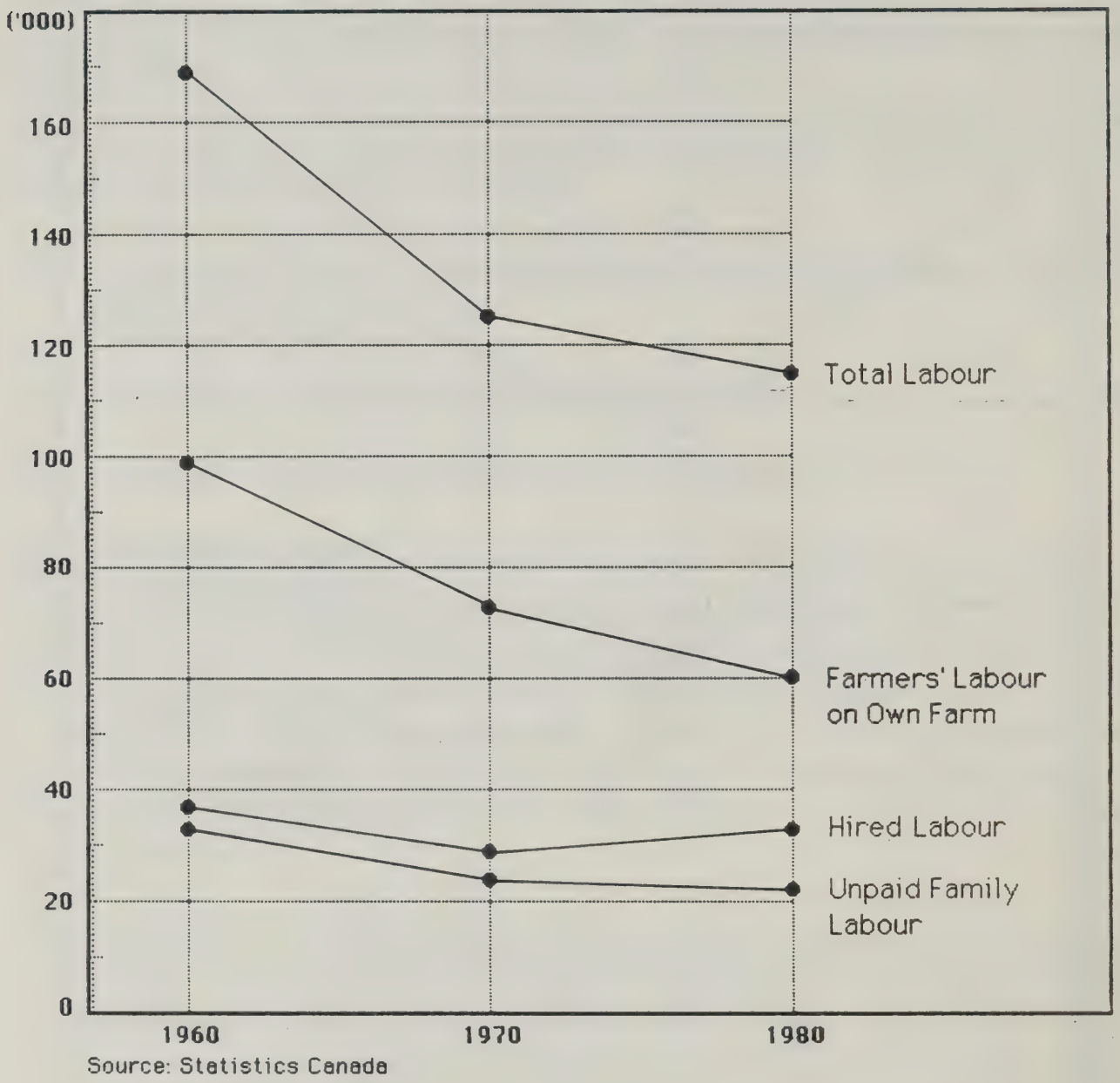
Person-Year Equivalents of Paid Labour and Off-Farm Work, Ontario, 1960-1980



Source: Statistics Canada

Figure 6

Number of Person-year Equivalents of Farmers Labour, Hired Labour, and Family Labour, Ontario, 1960-1980



Source: Statistics Canada

The rate of decrease from 1960 to 1980 for the labour inputs were:

- o farmers labour on own farm — 38.7 percent
- o unpaid family labour — 33.3 percent
- o hired labour — 10.4 percent
- o total labour — 31.5 percent

The farmers' labour on their own farms made up 58.5 percent of the total labour input in 1960 and 52.3 percent in 1980. Unpaid labour dropped only slightly, from 19.6 to 19.0 percent. The proportion of hired labour increased from 21.9 to 28.7 percent.

The pattern of a decrease in total labour inputs was observed in all Districts of Ontario (Figure 7 and Table 14). In the two decades the rate of decrease in the five Districts was as follows:

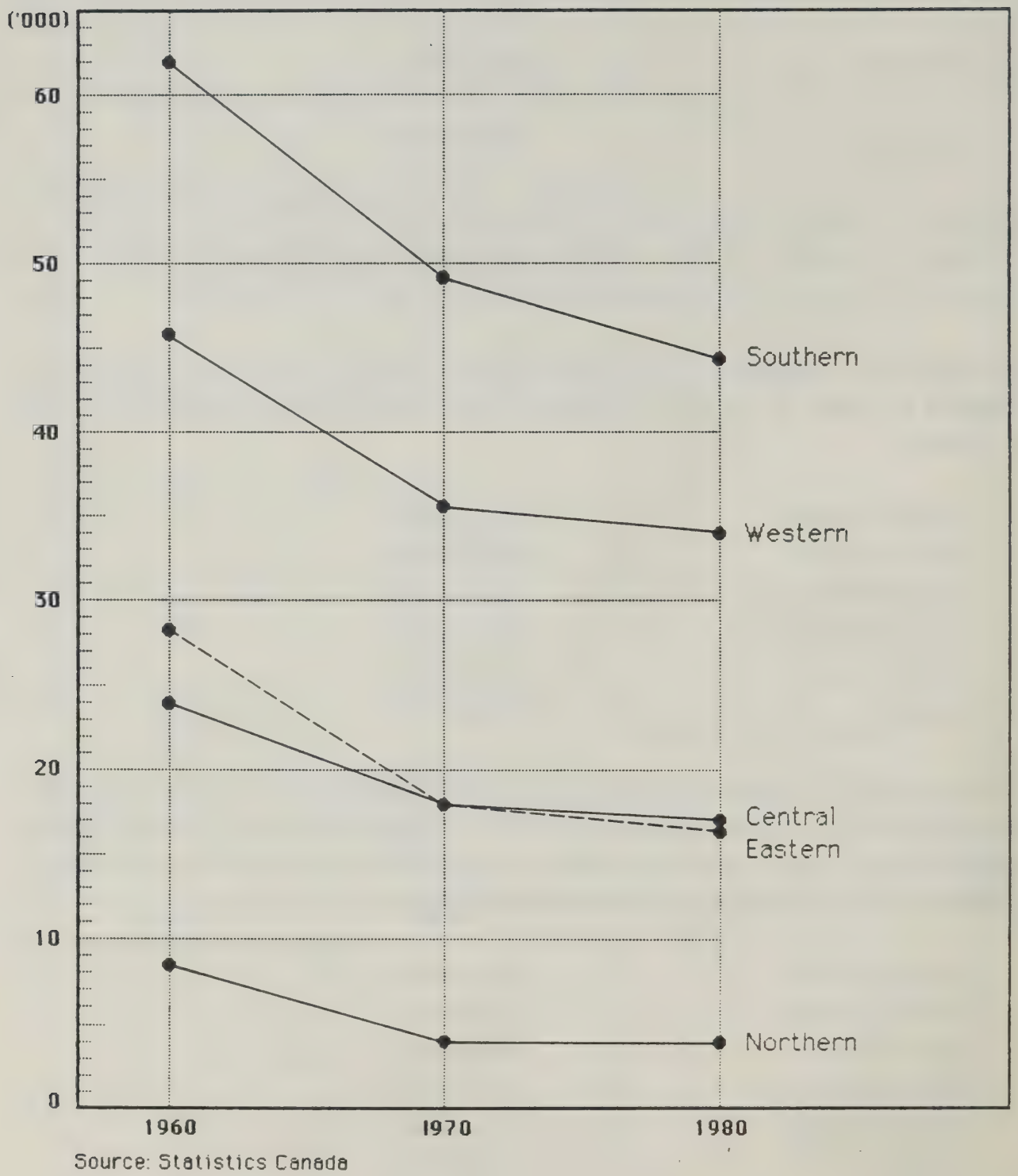
Southern District	—	27.8 percent
Western District	—	26.3 percent
Central District	—	30.8 percent
Eastern District	—	42.1 percent
Northern District	—	52.9 percent
Ontario	—	31.5 percent

The differences from District to District in rate of decrease in total labour inputs was accounted for mainly by differences in the number of farms going out of business through amalgamation or failure to produce enough to be classified as a census farm. The rate of decrease in farm numbers in the Districts was as follows:

Southern District	—	29.8 percent
Western District	—	27.8 percent
Central District	—	32.6 percent
Eastern District	—	38.1 percent
Northern District	—	46.4 percent
Ontario	—	32.0 percent

Figure 7

Person-Year Equivalents of All Labour on Ontario Farms, By District , 1960-1980



Source: Statistics Canada

Table 14

Person-Year Equivalents, Farmers Labour, Hired Labour, Unpaid Labour By District, Ontario 1960, 1970, 1980

Type of Labour		Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
				- number -			
	1960	32,024	29,518	14,961	17,198	4,981	98,682
Farmer's Labour	**1970**	24,935	22,084	10,713	11,903	2,709	72,344
on Own Farm	**1980**	20,999	18,926	8,789	9,329	2,405	60,448
	1960	19,262	7,747	4,990	4,137	793	36,929
Paid Labour	**1970**	16,159	6,192	3,684	2,520	472	29,027
	1980	16,233	8,150	4,518	3,542	657	33,100
	1960	10,617	8,549	4,178	6,820	2,835	32,999
Unpaid Labour	**1970**	8,290	7,108	3,708	3,905	989	24,000
	1980	7,466	6,711	3,389	3,443	991	22,000
	1960	61,903	45,814	24,129	28,155	8,609	168,610
Total Labour	**1970**	49,384	35,384	18,105	18,328	4,170	125,371
	1980	44,698	33,787	16,696	16,314	4,053	115,548

Source: Statistics Canada, Census of Agriculture, Ontario, 1961, 1971, 1981.

Note: Data for 1960 refer to the period June 1960 to May 1961.

Sources of labour varied from District to District. The Southern District was alone in a reliance on a large hired labour force (Figure 8). Hired and unpaid labour have been of relatively equal importance in the Western and Central Districts, but recently hired labour has become more important than family labour. Hired labour became as large as family labour for the first time in 1980 in the Eastern District. Hired labour remained lower than family labour in the Northern District.

Hired labour made up an increasing proportion of total labour in recent years. The proportion of labour from the three sources in 1980 in the Districts was as follows:

	Operator	Unpaid	Paid
Southern District	47.0%	16.7%	36.3%
Western District	56.0%	19.9%	24.1%
Central District	52.6%	20.3%	27.1%
Eastern District	57.2%	21.1%	21.7%
Northern District	59.3%	24.5%	16.2%
Ontario	52.3%	19.0%	28.7%

The person-year equivalents data compiled by District for 1980 were fairly accurate as operator and paid labour information was based on census data. The main probability of inaccuracy would come from the allocation of unpaid labour to Districts on the basis of farm numbers. The inaccuracy would be small as there was a relationship between the amount of unpaid labour and farm numbers in the Districts in the 1961 census data. In addition by 1980 unpaid labour accounted for only 19 percent of total labour inputs into agriculture.

The next step was to calculate labour inputs for the various farm types. The possibility of inaccuracy increased as unpaid labour was now allocated to 22 farm types as well as to the five Districts. The allocation was made on the basis of the number of farmers in each farm type (as in Table 4).

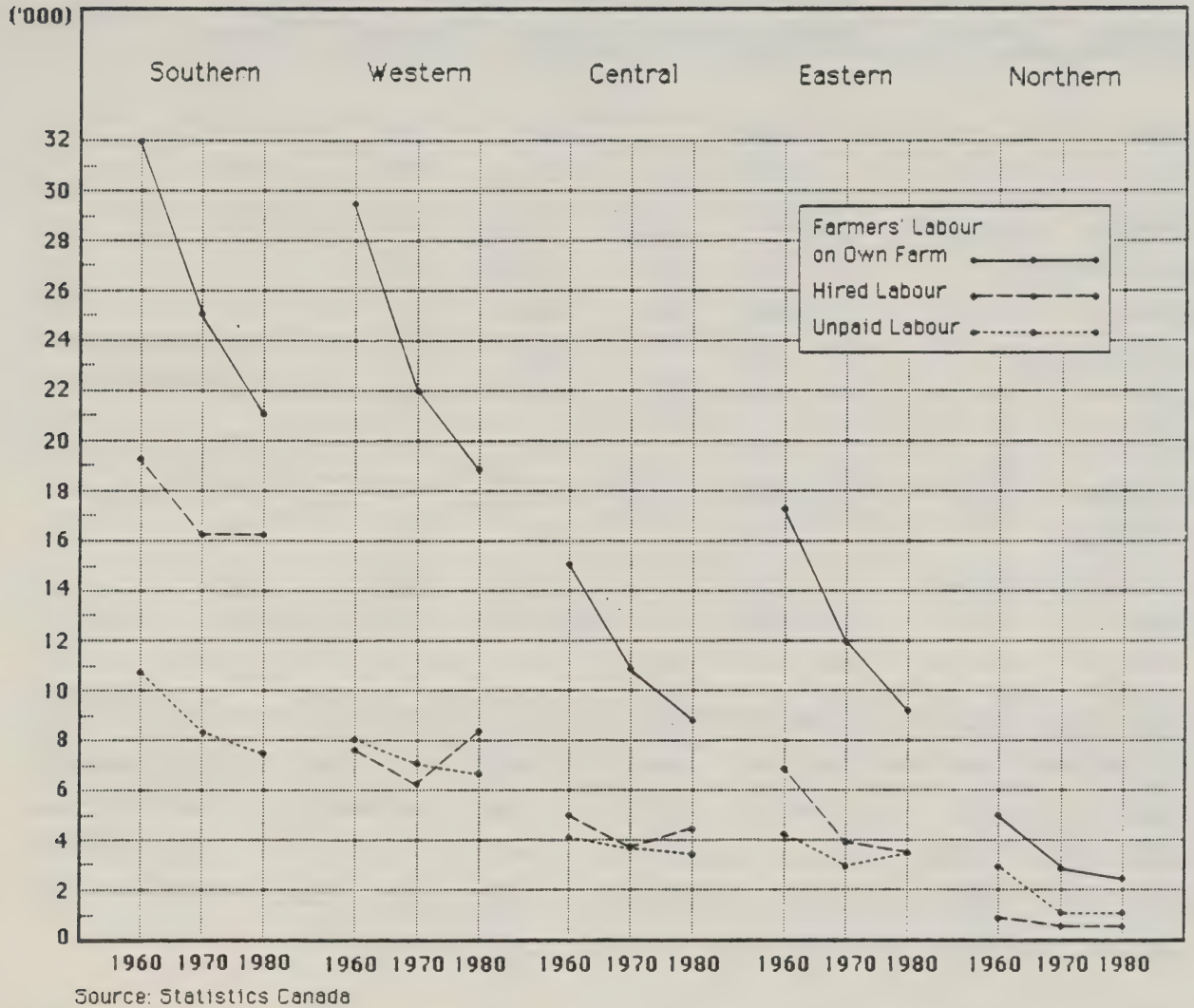
Person-year equivalents information on farm types was produced for:

- farmers work on their own farms (Appendix Table 4)

- unpaid labour (Appendix Table 5)

Figure 8

Number of Person-Year Equivalents of All Labour on Ontario Farms, By District and Labour Type, 1960-1980



Source: Statistics Canada

o all labour (Table 15).

The proportion of the Provinces' supply of labour used by the various farm types was as follows:

Farm Type	Farmers Work On Own Farm	Unpaid Labour	Paid Labour	Total Labour
Cattle	27.1	28.8	9.3	22.3
Dairy	20.4	16.1	18.9	19.2
Tobacco	3.4	2.7	14.0	6.3
Small Grain	7.4	7.9	2.8	6.2
Hogs	6.7	6.5	3.7	5.8
Grain Corn	6.4	6.9	3.1	5.6
Fruit	3.5	3.9	9.2	5.2
Poultry	3.1	3.3	6.4	4.1
Vegetable	2.8	2.8	6.3	3.8
Greenhouse	1.9	1.7	7.9	3.5
12 Other Farm Types	17.3	19.4	18.4	18.0
TOTAL	100.0	100.0	100.0	100.0

Cattle farms used more of the total labour supply than any other farm type although dairy producers also were very large users. Five other farm types each used over five percent of the total. Cattle and dairy farms used a large portion of operators labour and unpaid labour. Dairy farms and tobacco farms used one-third of the total amount of hired labour. Fruit and cattle farms required a substantial portion of the total hired labour and the horticultural operations required important amounts.

Table 15

Estimated Person-Year Equivalents of All Labour on Ontario Farms By Districts and Farm Type - 1980

Type of Farm	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Dairy	4,255	6,673	3,505	6,614	1,125	22,172
Cattle	3,569	10,800	4,931	4,950	1,553	25,803
Hogs	2,350	3,148	612	511	69	6,690
Poultry	1,639	1,744	638	549	165	4,735
Sheep and Goats	223	491	249	241	87	1,291
Livestock Combination	1,132	1,577	497	317	111	3,634
Horse	401	546	592	203	52	1,794
Other Animal Specialty	220	458	188	147	28	1,041
Sub-total	13,789	25,437	11,212	13,532	3,190	67,160
Wheat	511	185	163	37	3	899
Small Grain	3,716	1,827	720	586	314	7,163
Oilseed	3,379	61	15	11	2	3,468
Grain Corn	3,829	1,413	761	439	4	6,446
Forage	246	469	348	419	117	1,599
Dry Field Pea and Bean	71	129	4	-	-	204
Tobacco	7,045	32	245	-	-	7,322
Potato	153	354	63	46	50	666
Field Crop Combination	413	52	40	13	19	537
Sub-total	19,363	4,522	2,359	1,551	509	28,304
Fruit	4,240	830	697	186	25	5,978
Vegetables	2,735	642	806	185	49	4,417
Greenhouse Products	2,330	687	655	291	134	4,097
Nursery	934	526	346	133	44	1,983
Sub-total	10,239	2,685	2,504	795	252	16,475
Other Combination	1,307	1,143	621	436	102	3,609
Total	44,698	33,787	16,696	16,314	4,053	115,548

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

The relative importance of operators labour, unpaid labour, and paid labour to the various farm types was as follows:

Farm Type	Farmers Work on own Farm	Unpaid Labour	Paid Labour	Total Labour
Cattle	63.5	24.6	11.9	100.0
Dairy	55.7	16.0	28.3	100.0
Tobacco	28.4	8.2	63.4	100.0
Small Grain	62.8	24.3	12.9	100.0
Hogs	60.2	21.5	18.3	100.0
Grain Corn	60.4	23.5	16.1	100.0
Fruit	34.9	14.4	50.7	100.0
Poultry	40.1	15.4	44.5	100.0
Vegetable	39.0	14.0	47.0	100.0
Greenhouse	27.3	9.2	63.5	100.0
12 Other Farm Types	50.1	20.4	29.5	100.0
Ontario	52.3	19.0	28.7	100.0

Ontario farms obtained over half of their labour supply from operators labour, about one-fifth from unpaid labour and less than one-third from paid labour. Cattle, grain, corn, and hog farmers relied more on their own labour and unpaid labour. Paid labour was extremely important to tobacco, greenhouse, fruit, vegetable and poultry operations. These farm types used paid labour for 45 to 63 percent of their total labour requirments.

In summary, the preceding pages have built up a series of figures based on person-year equivalents that could be used to assess the incidence of farm fatalities and lost time injuries, in this or future studies. Allied with more readily available data on farm numbers and farm population(s) it would be a useful supplement to figures already available on farm numbers and total farm population.

FARM MACHINERY

Trends

The pervasive characteristic of Ontario agriculture in the post-war period has been its expansion in production at the same time that farm acreages and farm population were in decline. The production expansion was accomplished mainly by applying larger amounts of capital inputs, and a major capital input was machinery.

A significant level of mechanization had been achieved by 1961. In the 1951-1961 period trucks rose in number from 41,500 to 62,800, tractors from 105,200 to 150,000, grain combines from 10,000 to 22,400. This rate of growth (50 percent for the three types of machinery in a decade) would not be repeated after 1961, but other changes of significance would occur.

In the 20 year period, 1961 to 1981, the number of farms dropped by 38,885. However, the rate of mechanization continued, albiet at a slower pace (Figure 9). Tractors increased in numbers every census period, but showed some signs of reaching a plateau as the increase from 1976 to 1981 was small. Automobile numbers decreased steadily, but the decrease was slight in the last decade. Trucks increased substantially for 15 years and then reached a plateau. The opposite trend in car and truck numbers reflects a decreasing farm population and some tendency for new trucks, with attractive designs, to become a substitute for an automobile. Grain combines remained relatively stable in numbers, balers increased some and forage harvesters rose steadily and significantly.

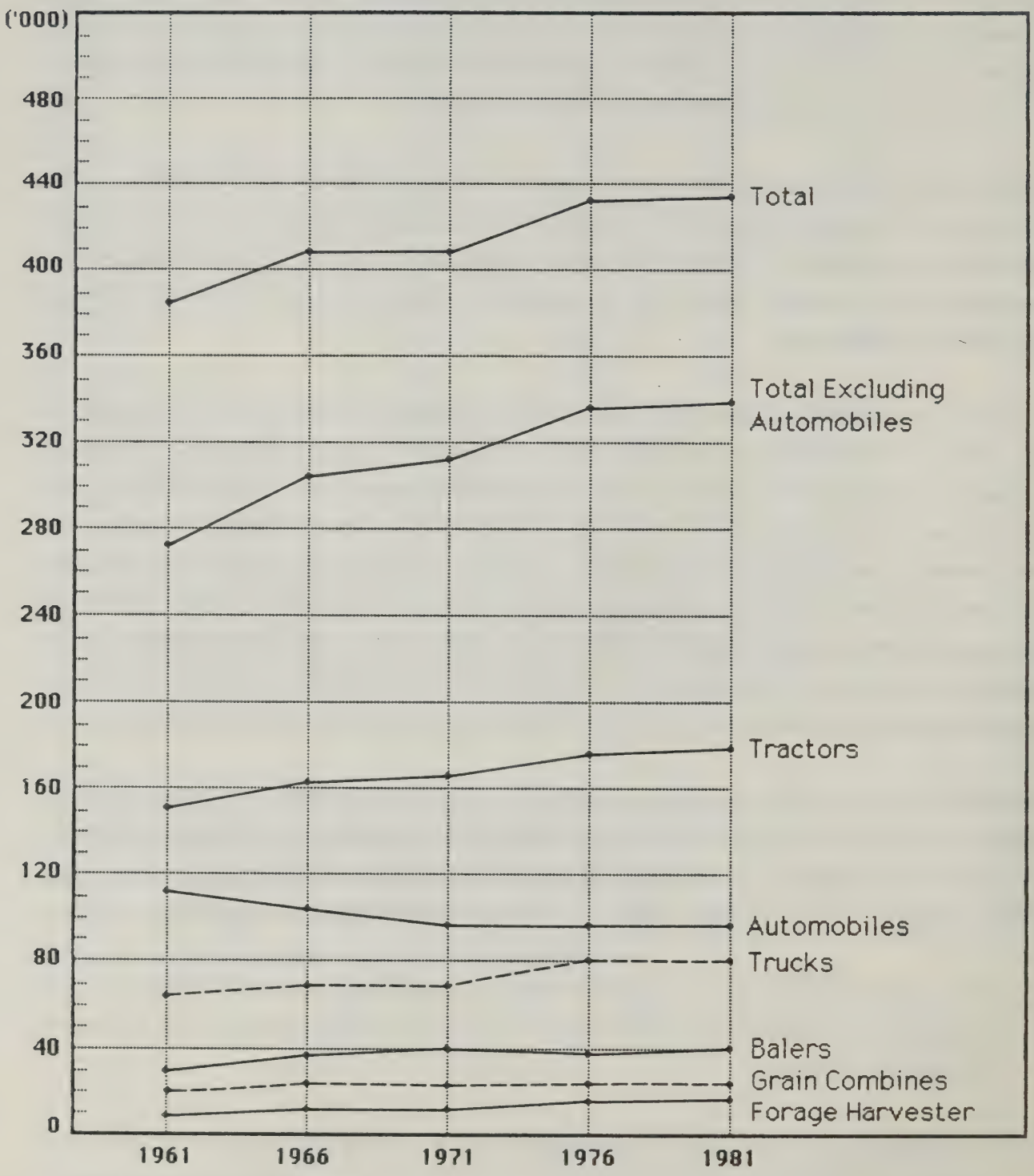
The total of these six machines probably represented the general trend to farm mechanization from 1961 to 1981 and thus indicated the expansion in mechanical hazards that faced farm people. It could only be an indication because other factors enter into safety and health considerations. Three of these other interrelated considerations were:

1. The total number of the six machines might not be highly correlated with the total number for all farm machines and might not represent the situation for all machines involved in accidents.

2. Machinery size, quality and design changed in the 20 year period and numbers alone would not reflect exposure to hazards.

Figure 9

Number of Selected Farm Machines
Ontario, 1961-1981



Source: Statistics Canada

3. The degree of hazard posed by machine existence could be influenced by farm safety campaigns, changes in machine design and opportunity for exposure to hazards. The change from a small to a very large tractor might influence the overall risk of fatalities and injuries in several ways, none of them subject to precise quantitative analysis.

The total number of the six machines enumerated in the Census from 1961 to 1981 increased from 383,024 to 436,211, a rise of only 13.9 percent. Changes for individual machines were:

- o Forage Harvesters — 82.8 percent increase
- o Balers — 40.9 percent increase
- o Trucks — 28.1 percent increase
- o Tractors — 18.7 percent increase
- o Grain Combines — 12.3 percent increase
- o Automobiles — 12.7 percent increase

The increase in five of the machines (excluding automobiles) was 34.6 percent in the 20 years. During the same period the number of person-year equivalents decreased by 31.5 percent.

The trend to more machines occurred at the same time as numbers of farms and farm population decreased — resulting in an increase in the ratio of machines to people (Table 16). Total selected machines per farm increased by 67.6 percent in the 20 year period, and the increase in machines per 100 farm people was 89.7 percent. Tractors, associated with a high proportion of farm accidents, rose in relation to farms by 74.4 percent and in relation to farm people by 97.9 percent. This increase in the exposure of farm people to the hazards of farm machines was significant. Even in the case of automobiles there was a rise in exposure of farm people by 46. 2 percent despite a drop in total number of cars on farms.

Farm Machinery on Ontario Farms, 1980

Some idea can be obtained as to the degree of mechanization of farm operations by Districts of Ontario. One measure was the number of six selected machines in each District (Table 17). Other measures were the value of machinery and equipment, and the expenditures made for machine rental and custom work. All measures indicated that the

Table 16

Number of Selected Farm Machines Per 100 Farms and Per 100 Farm People, Ontario, 1961 and 1981

Machine	Farm Machines Per 100 Farms		Farm Machines Per 100 Farm People	
	1961	1981	1961	1981
	- number			
Tractors	123.8	215.9	28.6	56.6
Automobiles	91.3	117.3	21.0	30.7
Trucks	51.8	97.6	12.0	25.5
Balers	23.1	48.0	5.4	12.5
Grain Combines	18.5	30.5	4.3	8.0
Forage Harvesters	7.4	19.8	1.7	5.2
Total 6 Machines	315.9	529.1	73.0	138.5

Source: Statistics Canada, Census of Agriculture, Ontario, 1961, 1981.

Table 17

Proportion of Farms, Machinery Value, Machine Numbers, Machine Rental and Custom Work in Districts of Ontario - 1980

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- percent -			
Farms	33.9	30.5	15.4	15.7	4.5	100.0
Value of Machinery and Equipment	41.0	29.6	12.3	13.6	3.5	100.0
Number of Six Selected Machines	35.0	31.3	14.4	14.9	4.4	100.0
Expenditure for Machine Rental and Custom Work	41.5	33.8	13.0	10.3	1.4	100.0

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

degree of mechanization through machinery and equipment was higher in the Southern District than in other Districts. Two of the three measures show a high degree of mechanization in the Western District as compared to Central, Eastern and Northern Districts. The six machines reported in the Census would not reflect the complete picture of mechanization in Southern and Western Ontario because the many different enterprises of those areas would require a mix of specialized machines and equipment that would not exist in other Districts.

By 1980 tractor numbers in Ontario were larger than the combined total of cars and trucks. Regionally this was true for the Southern and Western Districts, but cars and trucks outnumbered tractors in the other three Districts (Table 18). More farms reported tractors than cars in all Districts. The proportion of farmers reporting tractors was 89 percent compared with 82 percent for automobiles.

Tractors accounted for 39.6 percent of the seven machines recorded in the 1981 Census. The percentages by District were:

Southern	—	42.9 percent
Western	—	38.8 percent
Central	—	37.0 percent
Eastern	—	37.2 percent
Northern	—	36.7 percent
Ontario	—	39.6 percent

The density of tractors in the machine inventory was higher in the Southern District than in other Districts.

Tractor numbers were examined in terms of the number of tractors per farm by Districts and type of agriculture (Table 19). Tractor numbers per farm, in total, were higher in the Southern District than in other Districts and this also was true for most farm types.

Table 18

Farm Machinery on Ontario Farms, By District - 1980

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Number of Farms	27,975	25,151	12,702	12,905	3,715	82,448
Farms Reporting Automobiles	23,801	20,375	10,142	10,511	2,685	67,514
Farms Reporting Trucks	21,380	17,274	8,938	8,836	2,699	59,127
Farms Reporting Tractors	25,144	22,233	11,094	11,684	3,381	73,536
Farms Reporting Grain Combines	8,706	7,585	3,169	3,200	1,113	23,773
Farms Reporting Swathers	1,916	6,038	1,489	1,912	1,029	12,384
Farms Reporting Balers	7,527	13,110	6,551	8,185	2,471	37,844
Farms Reporting Forage Harvesters	3,728	5,740	1,881	2,898	515	14,762
Farms Reporting Machine Rental and Custom Work	14,979	14,346	6,333	5,894	1,231	42,783
Number of Automobiles	34,870	28,846	14,843	14,519	3,623	96,701
Number of Trucks	31,602	22,950	11,928	10,582	3,392	80,454
Number of Tractors	67,414	54,519	23,850	24,953	7,305	178.041
Number of Grain Combines	9,365	7,974	3,330	3,291	1,174	25,134
Number of Swathers	1,993	6,239	1,553	2,018	1,087	12,890
Number of Balers	7,796	13,656	6,847	8,464	2,767	39,530
Number of Forage Harvesters	4,175	6,375	2,065	3,186	550	16,351
Sub-total - Number of Selected Machines	157,215	140,559	64,416	67,013	19,898	449,101
Expenditure for Machines Rental and Custom Work	$33,584,814	$27,399,162	$10,498,069	$8,331,914	$1,125,076	$80,939,035
Total Value of All Machinery and Equipment	$1,419,574,232	$1,024,485,206	$425,204,059	$472,572,923	$120,298,106	$3,462,134,526

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Table 19

Number of Tractors Per Farm in Districts of Ontario, By Type of Farm - 1980

Type of Farm	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Dairy	3.2	2.9	2.8	2.8	2.9	2.9
Cattle	2.3	2.2	1.8	1.6	2.0	2.0
Hogs	2.0	1.8	1.7	1.4	1.5	1.8
Poultry	1.2	1.4	1.0	1.1	1.2	1.4
Sheep and Goats	1.0	1.1	.9	.9	1.3	1.0
Livestock Combination	2.7	2.2	1.6	1.5	1.7	2.1
Horse	1.2	1.1	1.2	1.1	1.1	1.1
Other Animal Specialty	.6	.7	.5	.4	.4	.5
Sub-total	2.4	2.3	1.9	2.0	1.6	2.2
Wheat	1.8	1.6	1.4	1.3	1.5	1.6
Small Grain	2.8	2.0	1.8	1.5	1.7	2.2
Oilseed	2.3	1.7	1.7	1.7	1.0	2.3
Grain Corn	2.3	2.0	2.0	2.1	2.5	2.2
Forage	1.3	1.0	.9	1.0	1.4	1.1
Dry Field Pea and Bean	1.9	2.0	1.0	-	-	1.9
Tobaccco	3.4	3.0	3.2	-	-	3.4
Potato	3.3	3.5	1.8	1.7	1.6	2.7
Field Crop Combination	3.1	2.2	2.0	1.8	1.5	2.7
Sub-total	2.6	1.9	1.8	1.6	1.7	2.3
Fruit	1.9	1.6	1.6	1.2	.9	1.7
Vegetables	2.6	2.3	2.6	1.3	1.0	2.4
Greenhouse Products	1.3	.8	1.0	.7	.6	1.1
Nursery	2.6	2.6	2.5	1.8	2.4	2.4
Sub-total	2.0	1.8	2.0	1.2	1.1	1.9
Other Combination	2.2	1.2	1.2	1.1	1.1	1.5
Total	2.4	2.1	1.8	1.9	1.9	2.2

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

AGRICULTURAL CHEMICALS

Introduction

Chemicals were used in the late nineteenth century to reduce yield losses from insects and diseases, but chemical use increased substantially after World War II. In earlier years residues built up in the soil and governments introduced legislation and programs to monitor and control the use of chemicals. Environmental concern multiplied in the post-war period as quantities and types of chemicals increased and more attention was given to research, education and regulation. An increased awareness developed in the 1970's as to the health hazards to humans and some chemical products were removed from the market (5). In addition some pests developed a resistance to chemical control measures.

The use of chemicals has enhanced agricultural efficiency and the need for chemical controls remains. However agriculture has become too dependent on chemicals and measures have been taken to reduce that dependence. Prominent among these measures was the integrated pest management system whereby insects, diseases and weeds were subjected to a mix of chemical, physical and biological control techniques.

Information was scarce on the use of pesticides by Ontario farmers until the 1970's when the increasing importance of chemicals to agriculture, and the rise in public concern, led to greater efforts to obtain information. Many groups expressed concern about contamination of fish and wildlife in the Great Lakes area. The United States and Canada signed the Great Lakes Water Quality Agreement in 1972 and the International Joint Commission had responsibility for implementing the Agreement. A committee established by the Commission requested a survey of pesticide use be carried out every five years to identify agricultural pesticide use in Ontario. Three surveys were carried out, in 1973, 1978 and 1983. The 1983 survey report will be published soon. Statistics Canada, in the Census of 1971, had obtained spraying and dusting data for the first time. This information was collected again in 1981.

Farmers Spraying and Dusting, 1970 and 1980

In 1970, 50,061 Ontario farmers reported spraying or dusting operations. These farmers were 52.8 percent of Ontario's farmers. In 1980, 50,891 producers reported spraying or dusting operations. Although the number had not increased much the proportion had

risen to 61.7 percent because the number of farmers had decreased from 94,722 in 1971 to 82,448 in 1981. Other measures of changes in spraying and dusting in the decade were as follows:

	1970	1980
Acres sprayed and dusted for insects and disease	577,230	949,005
Acres sprayed and dusted for weeds and brush	2,758,119	4,753,376
Farms spraying and dusting for insects and diseases	14,906	14,104
Farms spraying and dusting for weeds and brush	42,671	47,231

In 1980 the proportion of farmers spraying or dusting decreased as one moved east and north, 78.9 percent in the Southern District used these chemicals, 64.5 percent in the Western District, 50.1 percent in the Central District, 44.4 percent in the Eastern District and 20.1 percent in the Northern District (Table 20). The incidence of spraying or dusting reflected several factors, including the interrelated factors of climate, type of agriculture, and size of operation.

The average expenditure per farmer who applied these chemicals also decreased in the same pattern, Southern District farmers spent $2,643, Western District farmers $1,312, Central District farmers $1,271, Eastern District farmers $891, Northern District farmers $116.

Southern District producers spent $57.7 million for chemicals in 1980, and this represented 62.3 percent of the Ontario total — despite the District having only 33.9 percent of the farms and 36.6 percent of the crop acreage (Table 20). Expenditures by Western District farmers were fairly high, but expenditures in the other three Districts were very low relative to farm numbers.

Southern District acreage sprayed or dusted for weeds and brush was 2.3 million, almost 48 percent of the Provincial total. Chemical applications for insects and disease covered 596,017 acres in the Southern District, almost 63 percent of the Ontario total.

Seven farm types accounted for 74.3 percent of Ontario farmers expenditures for agricultural chemicals (Table 21). Expenditures on grain and tobacco farm types were relatively high, but were important also for the other five farm types. Chemical expenditures for tobacco farms were dominant in Southern Ontario, and for cattle farms in Western Ontario.

Table 20

Farmers Reporting Use of Agricultural Chemicals By District - 1980

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- Number -			
Number of Farms	27,975	25,151	12,702	12,905	3,715	82,448
Number Farms Reporting Spraying and Dusting	21,835	16,210	6,368	5,731	747	50,891
Number Farms Reporting Spraying or Dusting Weeds and Brush	19,734	15,499	5,839	5,475	684	47,231
Number Farms Reporting Spraying For Control of Insects and Disease	8,981	3,040	1,410	538	135	14,104
Number Farms Reporting Purchase of Agricultural Chemicals	20,552	14,636	5,900	5,739	938	47,765
Acreage Sprayed or Dusted for Control of Weeds and Brush	2,267,545	1,562,018	486,886	392,037	44,890	4,753,376
Acreage Sprayed or Dusted for Control of Insects and Disease	596,017	265,393	60,826	22,582	4,187	949,005
Expenditures for Agricultural Chemicals	$57,705,883	$21,266,759	$8,096,120	$5,107,745	$432,085	$92,608,592
			Proportion of Ontario			
Farms	33.9	30.5	15.4	15.7	4.5	100.0
Farms Reporting Spraying and Dusting	42.9	31.8	12.5	11.3	1.5	100.0
Farms Reporting Spraying and Dusting for Weeds and Brush	41.8	32.8	12.4	11.6	1.4	100.0
Farms Reporting Spraying and Dusting for Control of Insects and Disease	63.7	21.6	10.0	3.8	.9	100.0
Farms Reporting Purchase of Agricultural Chemicals	43.0	30.6	12.4	12.0	2.0	100.0
Acreage Sprayed or Dusted for Control of Weeds and Brush	47.7	32.9	10.2	8.2	1.0	100.0
Acreage Sprayed or Dusted for Control of Insects and Disease	62.8	28.0	6.4	2.4	.4	100.0
Expenditures for Agricultural Chemicals	62.3	23.0	8.7	5.5	.5	100.0

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Note: Expenditures did not include custom work.

Table 21

Farmers' Expenditures for Agricultural Chemicals By Selected Farm Types and Districts - 1980

Farm Type	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- millions of dollars -			
Grain Corn	8.7	3.7	1.4	See Note 1 .8	See Note 1	14.6
Tobacco	12.7	.1	.4	-	-	13.2
Dairy	2.9	2.7	1.5	2.6	.2	9.9
Small Grain	7.0	1.9	.4	.1	.1	9.5
Cattle	3.1	4.4	.9	.5	.1	9.0
Fruit	4.9	.8	.8	.2	-	6.8
Vegetables	3.5	.9	1.3	.1	-	5.8
Total 7 Farm Types	42.8[2]	14.6	6.7	See Note 1 4.7	See Note 1	68.8
7 Farm Types Expenditures as Proportion Expenditures of 22 Farm Types	74.2	68.5	82.7	See Note 1 84.8	See Note 1	74.3

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Notes: [1] Grain Corn Data for Eastern and Northern Ontario Districts were combined to comply with secrecy requirements of Statistics Canada.

[2] Chemical Expenditures for Oilseed Farms in the Southern District were $5.3 million.

Pesticide Use in Ontario, 1978

The 1978 survey, carried out for a committee established by the International Joint Commission, was designed to identify and quantify the pesticides used in Ontario (6). A comparison of the pesticide quantities of the 1978 survey with the census expenditure patterns of 1980, by District, revealed that the quantity data of 1978 gave a fairly accurate picture of pesticide use by District in Ontario agriculture. The comparison was as follows:

	Quantity Percent 1978	Expenditure Percent 1980
Southern District	62.6	62.3
Western District	21.2	23.0
Central District	8.2	8.7
Eastern District	7.7	5.5
Northern District	.3	.5
Ontario	100.0	100.0

The Southern District used more of every type of pesticide than any other District (Table 22). Herbicide use in that District accounted for 51.1 percent of the Ontario total, insecticide use 67.1 percent, nematocides 93.6 percent, fungicides 54.5 percent, growth regulator 98.4 percent. The predominance of pesticide use in the Southern District was due to the high proportion, in that District, of the Province's corn acreage (46.5 percent), tobacco acreage (85.1 percent), and soyabean acreage (97.3 percent).

Previously it was noted that grain corn and tobacco farm types had the largest expenditures for pesticides. Examining data only by farm type concealed the real impact of corn and tobacco on farm pesticide requirements. An examination by crop use of pesticides shows that corn acreages took 48.0 percent of total pesticides used, and tobacco 25.3 percent (Table 23). Other crops, significantly concentrated in the Southern District, also were important in the demand for pesticides. These included soyabeans, vegetables and fruits.

Table 22

Quantities of Active Ingredients of Each Type of Pesticide Used on Field Crops Fruits, Vegetables, and Roadsides, By District, Ontario - 1978

Pesticide	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario[1]	Ontario
			- kilograms -			
Herbicides:[2]						
Triazine	857,506	666,567	223,660	248,795	3,582	2,000,110
Phenoxy	117,902	186,212	39,972	40,658	9,826	394,570
Other	1,216,450	353,124	113,912	205,488	2,596	1,891,570
Insecticides	281,947	95,808	32,819	7,317	2,619	420,310
Nematocides	1,082,090	1,320	73,190	—	—	1,156,600
Fungicides[3]	206,210	104,817	52,243	11,610	3,499	378,379
Growth Regulator	397,090	—	6,410	—	—	403,500
Total	4,159,195	1,407,848	542,206	513,868	22,122	6,645,239

Source: Economics Branch, Ontario Ministry of Agriculture and Food, Survey of Pesticide Use in Ontario, 1978, p.24.

Notes: [1] Complete data not available for Northern Ontario.

[2] Does not include roadside sprays other than 2,4-D amine, 2,4,5-T, and 2,4-DP.

[3] Does not include greenhouse use of Fungicides.

Table 23

Area Sprayed and Quantities of Active Ingredients of Pesticides Used on Field Crops, Fruits and Vegetables Ontario - 1978.

Crop	Area Sprayed	Area Sprayed as Proportion Area Grown	Quantity Pesticides Used	Proportion of Total Pesticides Used
	- '000 ha. -	- percent -	- Tonnes -	- percent -
Corn	969.8	95.1	3,155.8	48.0
Tobacco	43.0	100.0	1,665.0	25.3
Soybeans	271.3	95.1	527.5	8.0
Vegetables	68.1	95.9	421.9	6.4
Fruit	27.6	97.2	349.4	5.3
Grains [1]	471.3	57.8	269.8	4.1
Dry Beans	66.2	98.8	166.8	2.6
Hay	40.4	3.5	13.8	.2
Pasture	6.1	.9	3.9	.1
Total	1,963.8		6,573.9[2]	100.0

Source: Economics Branch, Ontario Ministry of Agriculture and Food, Survey of Pesticide Use in Ontario, 1978, p. 23.

Notes:
1. Includes winter wheat, spring wheat, fall rye, oats, barley and mixed grains.
2. An additional 83.0 tonnes were applied to roadsides.

FARM FATALITIES AND LOST TIME INJURIES

Introduction

The intent of an examination of fatality and lost time injury data in agriculture was to relate such material to the farm structure data. With a view to identifying variations in the health and safety experience of people who live and work on farms. This was difficult because of a lack of comparability between data sources and the necessity to rely on secondary material. Therefore, the procedure adopted was to adapt available fatality and lost time injury material to the farm structure outlined in previous chapters — recognizing that the lack of comparability and a necessity to rely on secondary material imposed severe limitations on the effort.

Fatality information in Ontario was found mainly in the offices of the Registrar General of Ontario, Farm Safety Association of Ontario, the Ontario Ministry of Transportation and Communications, and the Office of the Chief Coroner of Ontario. Lost Time injury data were provided by The Farm Safety Association and the Workers' Compensation Board.

The Workers' Compensation Board provided lost time injury information to the Farm Safety Association and the Association analyzed the material and issued annual reports. The material analyzed encompassed 99 percent of all lost time injuries in agriculture that were reported to the Board. The annual reports of the Farm Safety Association from 1978 to 1982 were used for calculations on lost time injuries that appear in this report. The information was aggregated into five year totals with the intent that this would deal with the problem of annual variations in experience and data coding, and that the result probably would conform fairly well to actual experience.

Injuries reported to the Workers' Compensation Board represented mainly those incurred by hired labour as no adequate data existed to determine the lost time injury experience of farmers and unpaid labour.

The Farm Safety Association systematically collected fatality information from several sources, including the Workers' Compensation Board, The Ontario Provincial Police, a newspaper clipping service, and contacts in the farm community. Fatality data collected by the Association were regarded as representative of fatalities related to the operation of farms in Ontario. The Farm Safety Association made a judgement as to whether a

fatality was related to agriculture and for the purpose of this study that judgement was accepted for most of the fatalities.

The Association's material was published annually in the form of a description of each fatal accident and information on the person killed. This material, supplemented by some information from the Coroner's office and the Ministry of Transportation and Communications formed the basis for calculations on fatalities that were related to agricultural activities in the 1979-1982 period.

The Farm Safety Association fatality material, plus supplementary information, was analyzed as to geographic location of the accident, age of victim, month of occurrence and other factors related to the occurrence. Although information on 183 fatalities was available for the four year period, the calculations were based usually on 176 deaths because of a lack of some information for seven fatalities reported to the Association. Three of the seven fatalities were in the Western District and there was one in each of the other Districts.

Annual reports of the Farm Safety Association gave the following agriculturally related fatalities (collected by the Association) and lost time injuries (reported to the WCB) since 1976:

	Fatalities	Lost Time Injuries
1976	53	1,936
1977	50	2,078
1978	46	2,314
1979	44	2,200
1980	50	2,650
1981	40	2,573
1982	45	2,472

Calculations on fatalities occurring on the farm property (excluding the residence) were based on material from the Registrar Generals' office. These fatalities included both agricultural and non-agricultural fatalities. These data also were aggregated for the four year period 1979 to 1982, and are analyzed in the next chapter.

Farm Fatalities and Lost Time Injuries, By Month

A large proportion of fatalities (50%) related to agriculture from 1979 to 1982 was concentrated into three months of the year — May, August and November (Table 24). Fatalities also were relatively high in June, July, September and October.

Lost time injuries were more evenly distributed over the year, although 43.9 percent occurred in the three months of July to September.

Table 24

Total Farm Fatalities (1979–1982) and Lost Time Injuries (1978–1982) By Month, Ontario [1]

Month	Fatalities		Lost Time Injuries	
	Number	Proportion of Year	Number	Proportion of Year
	No.	%	No.	%
January	9	5.1	455	3.9
February	2	1.1	423	3.6
March	5	2.8	466	3.9
April	7	4.0	628	5.3
May	27	15.3	997	8.4
July	16	9.1	1,258	10.6
August	33	18.8	2,329	19.7
September	13	7.4	1,612	13.6
October	14	8.0	1,155	9.8
November	28	15.9	867	7.3
December	9	5.1	506	4.3
Year	176	100.0	11,825	100.0

Sources: Farm Safety Association Inc., Farm Fatality Reports, 1979-1982 and Survey of Agricultural Lost Time Injuries, 1978-1982.

FARM FATALITIES

Fatalities among farm people usually are examined in terms of geographic area, specific location of accident, age and sex of the victim, relation to an agricultural activity, and agent(s) involved in the fatality.

Data limitations prevented a very systematic examination of fatalities. The chief limitation was that data from one source could not be compared readily with data from other sources. Therefore the basic elements of the data base will be reviewed before setting out quantitative results.

Data Base

Farm fatalities were classified in various ways by organizations that recorded and analyzed fatalities. Each organization had a specific mandate and the collection and analysis system was geared to meet the objectives of the organization. For example the objectives of the Office of the Registrar General of Ontario, were different from those of the Farm Safety Association of Ontario. The Farm Safety Associations' objective was to compile and analyze data on agriculturally related fatalities and lost time injuries. The Registrar Generals' Office was charged with the responsibility for collecting data on all accidental and violent deaths of Ontario people, whether the fatality occurred in Ontario or elsewhere. Therefore, the emphasis was on all deaths rather than on fatalities related to agricultural activities. The importance of The Registrar General's records was in the picture it gave of the general situation regarding violent and accidental deaths that occurred on the farm property.

The records of the Registrar General of Ontario contained information on deaths that occurred on the farm property, but deaths occurring in the farm house were recorded as deaths in a residence and were not identified as deaths in a farm house. Fatalities that occurred off the farm, such as traffic fatalities, were not recorded as farm related accidents.

Records of the Coroners' Office were used to identify four additional fatalities and to supplement information made available by The Farm Safety Association .

Information from the Ministry of Transportation and Communications provided a picture of the fatalities and injuries involving tractors and motor vehicles in an off-farm environment.

Farm Safety Association data form the basis for any systematic analysis of fatalities on Ontario farms. The Farm Safety Association believes that its fatality data are representative of agriculturally related fatalities in Ontario and that the yearly data have been consistent from 1979. There was no claim as to exact knowledge of how many deaths occur in Ontario agriculture each year. Three checks were made to see if an estimate could be derived of total agriculturally related deaths by using Farm Safety data as the base.

The procedure was as follows:

1. There were 19 fatal accidents in Ontario in the four years 1979 to 1982 involving a motor vehicle and tractor. Only three such occurrences could be identified definitely from Farm Safety information.

2. A cursory examination of information in the Coroner's Office turned up only four additional farm fatalities that were not on the Farm Safety list of fatalities, although a possibility exists that there were others.

3. Farm Safety Association data were compared with information in the Office of the Registrar General.

A direct comparison was impossible as two different approaches to data collection and coding were used by the two organizations. In addition the analysis of the Farm Safety data used in this study probably considered some fatalities as being farm machinery related that may have been classified differently by someone else. However, the following rough calculation was made on machinery related fatalities.

Using Farm Safety Association information, it was possible to delineate 136 fatalities in four years as being related to farm machinery. This result was made somewhat comparable to information in the Registrar General's office by subtracting from the 136 fatalities those 26 fatalities reported by the Association as occurring off the farm. The resulting total of 110 fatalities were compared to the 83 farm machinery related fatalities reported by the Registrar General. The difference was large (27 fatalities) and probably was due mainly to classification differences. The higher fatality figures obtained using the Association's raw data, and the information in the Coroner's Office and the Registrar Generals' Office lent some credence to a belief that the Farm Safety Association has collected data on most of Ontario's agriculturally related fatalities

occurring on farms. The Association data underestimates the number of agriculturally related deaths occurring on roads.

The belief that the Farm Safety Association has collected data on most of the on-farm fatalities was reinforced by another calculation involving data of the Association and the Registrar General's Office (see section entitled Farm Fatality Rates for details).

The data outlined above were used to discuss the following subjects, using the specified data sources:

1. Fatalities on the Farm property - excluding house (office of the Registrar General).

2. Fatalities Related to Agriculture - By District and Age (mainly Farm Safety Association).

3. Fatalities Related to Agriculture - Farm Machinery (mainly Farm Safety Association)

4. Fatalities Related to Agriculture - Tractors (mainly Farm Safety Association and Ministry of Transportation and Communication).

5. Fatalities Related to Agriculture - Not Involving Tractors (mainly Farm Safety Association).

6. Fatality Rates

Fatalities on The Farm Property - Excluding House

Registrar General data were examined for the four year period 1979 to 1982. Total accidental and violent deaths on the farm (excluding the farm house) by year and sex were as follows:

1979	Male 66	Female 5	Total 71
1980	Male 69	Female 5	Total 74
1981	Male 60	Female 7	Total 67
1982	Male 55	Female 6	Total 61

Agents involved in the fatalities varied from year to year and therefore a total picture was obtained by aggregating all fatalities for the four years and analyzing the aggregated data by age, sex and the agent connected to the fatality.

Male deaths were 91.6 percent of the total deaths over the four year period (Table 25). Female fatalities were proportionately high in the under 15 age group, accounting for 21.7 percent of all female deaths. Three of the five female deaths were related to farm machinery. Two of the four female fatalities in the 30 to 34 age group were connected to farm machinery.

No clear age pattern emerged in male fatalities, but 28 percent were in age groups under 25 years of age. The 70 male deaths under 25 years of age were dominated by two main agents, suicides (21) and farm machinery (20).

The emphasis on these two agents came through strongly when the data were sorted by agent. Suicides were involved in 34.8 percent of total accidental and violent fatalities and farm machinery in 30.4 percent (Table 26). No other agent was nearly as significant, and only falls and falling objects were related to over five percent of deaths. The only agricultural agent other than farm machinery that could be identified clearly was the animal category, where three animal related deaths occurred in four years.

A summary of suicides and farm machinery related fatalities by age reveals the prevalence of machinery related deaths in the under 20 years of age groups and the predominance of suicides in seven of the eleven age groups from 20 upwards (Table 27). Together farm machinery and suicide related fatalities accounted for a majority in all but two age groups (under 15 and 70 and over) and were very high in some age groups.

Fatalities Related To Agriculture — By District and Age

Fatality information provided by the Farm Safety Association, and supplemented by other sources, was used to examine fatal accidents that were related to the business of producing agricultural products. The data were aggregated for the four year period 1979 to 1982.

Fatality numbers were similar in the Southern and Western Districts, but deaths were relatively higher in the Western District when account was taken of the number of person-year equivalents in the two Districts (Table 28). On the basis of person years fatal accidents were high in Northern Ontario.

Table 25

Fatalities Occurring on the Farm According to Sex and Age, 1979-1982

Age	Male Fatalities	Female Fatalities	Total Fatalities	
	number	number	number	percent
Under 15	20	5	25	9.1
15 - 19	23	2	25	9.1
20 - 24	27	1	28	10.3
25 - 29	15	1	16	5.9
30 - 34	28	4	32	11.7
36 - 39	11	1	12	4.4
40 - 44	11	1	12	4.4
45 - 49	22	0	22	8.1
50 - 54	14	0	14	5.1
55 - 59	20	3	23	8.4
60 - 64	22	2	24	8.8
65 - 69	16	0	16	5.9
70 and Over	21	3	24	8.8
Total	250	23	273	100.0

Source: Records of Registrar General

Note: Fatalities related to the farm house are excluded.

Table 26

Fatalities Occurring on the Farm According to Sex and Type of Fatality, 1979-1982

Agent	Male Fatalities	Female Fatalities	Total Fatalities	
	number	number	number	percent
Suicides	92	3	95	34.8
Agricultural Machinery	76	7	83	30.4
Fall	12	3	15	5.5
Falling Objects	15	0	15	5.5
Suffocation	13	0	13	4.8
Fire	6	5	11	4.0
Gases	8	1	9	3.3
Firearms	6	0	6	2.2
Electrical	6	0	6	2.2
Drowning	5	0	5	1.8
Animal	3	1	4	1.5
Lightning, Storm	3	1	4	1.5
Assaults	2	2	4	1.5
Explosives	1	0	1	.3
Other	2	0	2	.7
Total	250	23	273	100.0

Source: Records of Registrar General

Notes: 1 The Fatality classification system used by The Registrar General was the "International Classification of Diseases" 1975 Revision Vol. 1. World Health Organization, Geneva, 1977.

2 Fatalities related to the farm house were excluded.

Table 27

Farm Machinery and Suicide Fatalities Occurring on The Farm According to Age, 1979 - 1982

Age	Fatalities Related To: Suicide	Fatalities Related To: Farm Machinery	Suicide and Farm Machinery Related Fatalities as Proportion of Total Fatalities
	number	number	percent
Under 15	1	10	44.0
15 - 19	7	11	72.0
20 - 24	14	3	60.7
25 - 29	8	2	62.5
30 - 34	11	10	65.6
35 - 39	5	3	66.7
40 - 44	4	5	75.0
45 - 49	12	5	77.3
50 - 54	6	4	71.4
55 - 59	6	10	69.6
60 - 64	10	5	62.5
65 - 69	6	8	87.5
70 and Over	5	7	50.0
Total	95	83	65.2

Source: Records of Registrar General

Note: Fatalities related to the farm house were excluded.

Table 28

Farm Fatalities By District of Ontario, 1979 - 1982

District	1979 - 1982 Fatalities	Proportion of Ontario Fatalities	Proportion of Person-year Equivalents 1981
	number	percent	percent
Southern	55	31.3	38.7
Western	57	32.4	29.2
Central	24	13.6	14.5
Eastern	28	15.9	14.1
Northern	12	6.8	3.5
Ontario	176	100.0	100.0

Sources:
1. Farm Safety Association Inc., Farm Fatality Reports, 1979-1982.
2. Statistics Canada, Census of Agriculture, Ontario, 1981.
3. Office of the Chief Coroner, Ontario Ministry of the Solicitor General.

Annual variations in fatalities were wide in each of the Districts during the four year period, varying from 12 to 17 in the Southern District, 10 to 17 in the Western District, 4 to 8 in the Central District, 5 to 11 in the Eastern District and 2 to 3 in the Northern District.

One quarter of farm fatalities were under the 20 years of age group, and this level pertained to both tractor and non-tractor related accidents (Table 29). Fatal accidents were not as common to people in their twenties as to those in other age groups - thirties, forties etc. As a proportion of total fatalities the figures were as follows:

Age 20 - 29	9.6 percent
Age 30 - 39	14.8 percent
Age 40 - 49	11.3 percent
Age 50 - 59	17.7 percent
Age 60 - 69	14.2 percent
Age 70 and over	8.0 percent

The pattern of fatalities in the various age groups was similar for both tractor and non-tractor accidents.

Table 29

Farm Fatalities by Age of Victim and Whether Tractor Related or Non-Tractor Related, 1979 - 1982

Age	Tractor Related		Non-Tractor Related		Total Fatalities	
	Number	Proportion	Number	Proportion	Number	Proportion
	no.	percent	no.	percent	no.	percent
Under 15	16	15.1	9	12.9	25	14.2
15 - 19	10	9.5	8	11.5	18	10.2
20 - 24	8	7.5	4	5.7	12	6.8
25 - 29	3	2.8	2	2.9	5	2.8
30 - 34	10	9.4	5	7.1	15	8.5
35 - 39	6	5.7	5	7.1	11	6.3
40 - 44	6	5.7	2	2.9	8	4.5
45 - 49	5	4.7	7	10.0	12	6.8
50 - 54	6	5.7	8	11.5	14	8.0
55 - 59	12	11.3	5	7.1	17	9.7
60 - 64	7	6.6	5	7.1	12	6.8
65 - 69	8	7.5	5	7.1	13	7.4
70 and Over	9	8.5	5	7.1	14	8.0
Total	106	100.0	70	100.0	176	100.0

Sources: 1. Farm Safety Association Inc., Farm Fatality Reports, 1979 - 1982.

2. Office of the Chief Coroner, Ontario Ministry of the Solicitor General.

Fatalities Related to Agriculture - Involving Farm Machinery

Farm machinery was very prominent as an agent associated with agriculturally related deaths. In addition to the 106 tractor related fatalities there were at least 30 pieces of farm machinery associated with the fatalities not related to tractors. In total, therefore, 136 (77.3%) of the 176 agriculturally related fatalities were farm machinery type accidents. These 136 fatalities were associated with the following occurrences:

o a tractor in combination with another vehicle or inplement on the farm	54
o a tractor only, on the farm	21
o a tractor being used to move an object	11
o a tractor only, on a public road	11
o a tractor in a traffic accident on a public road	9
o a truck or car on the farm	7
o a truck or car in a traffic accident on a public road	6
o other farm machinery	17
Total	136

The 30 pieces of farm machinery, not related to tractors, that were associated with fatalities were distributed very unevenly by District and fatalities were as follows:

Southern District	—	7
Western District	—	19
Central District	—	1
Eastern District	—	3
Northern District	—	0
Ontario Total		30

There was no obvious explanation for the predominance of the Western area in this type of accident. The nineteen accidents in the Western District were associated with truck and car accidents (7) on and off the farm, several pieces of harvesting equipment (10) and an industrial loader.

Fatalities Related to Agriculture - Involving Tractors

A tractor related fatality was defined as one occurring while a tractor was being operated as a single machine or in conjunction with other equipment or objects. Approximately 60 percent of Ontario's agriculturally-related fatalities were associated with farm tractors in some way (Table 30). A much larger proportion of fatalities in the Central District (75%), Eastern District (72%), and Northern District (100%) were tractor related.

Two of the five Districts (Southern and Western) incurred a lower proportion of tractor related fatalities than might have been expected on the basis of tractor numbers. The experience of the Southern District was that only 24.5 percent of deaths occurred there while the District had 33.9 percent of Ontario's farmers and 37.9 percent of the tractors (Table 31). In addition that District had the highest number of tractors per farm.

Three Districts, Central, Eastern, and Northern, had higher tractor-related fatalities than expected on the basis of farm and tractor numbers. The Northern Districts' experience was particularly severe as the District had 11.3 percent of Ontario's tractor-related deaths while possessing only 4.5 percent of the farmers and 4.1 percent of the tractors.

Tractor-related fatalities were divided into those occurring with the tractor only (moving or being worked on), fatalities involving a tractor and another vehicle or implement, and those deaths arising from the use of a tractor to move objects. A large thirty percent of fatal accidents involved a tractor only, while ten percent occurred when moving objects (Table 32). On a District basis tractor only fatalities were relatively high in the Western District and low in the Central District. Tractor and objects accidents were relatively high in the Northern and Central Districts.

A tractor and another implement or vehicle were involved in 59.4 percent of tractor-related fatalities and this type of accident was dominant in all Districts.

As previously noted, 60 percent of all agriculture fatalities were tractor related. Tractor involvement in fatalities occurred in many ways, but one simplified way of examining these fatalities was in terms of fatalities occurring where:

Table 30

Farm Tractor Related and Non-Tractor Related Fatalities By District of Ontario, 1979 - 1982

District	Tractor Related Fatalities		Non-Tractor Related Fatalities		All Fatalities
	Number	Proportion	Number	Proportion	
	no.	%	no.	%	no.
Southern	26	50.9	29	49.1	55
Western	29	49.1	28	50.9	57
Central	18	75.0	6	25.0	24
Eastern	21	72.4	7	27.6	28
Northern	12	100.0	0	0	12
Ontario	106	60.5	70	39.5	176

Sources: 1. Farm Safety Association Inc., Farm Fatality Reports, 1979-1982.
2. Office of the Chief Coroner, Ontario Ministry of the Solicitor General.

Table 31

Farm Tractor Related Fatalities and Tractors on Farms By District of Ontario, 1979 - 1982

District	Number Tractor-Related Fatalities 1979 - 1982	Proportion of Ontario's Tractor-Related Fatalities 1979 - 1982	Proportion of Ontario Tractors 1981	Average Number Tractors Per Farm 1981
	no.	percent	percent	no.
Southern	26	24.5	37.9	2.41
Western	29	27.4	30.6	2.17
Central	18	17.0	13.4	1.88
Eastern	21	19.8	14.0	1.93
Northern	12	11.3	4.1	1.97
Ontario	106	100.0	100.0	2.16

Sources:
1. Farm Safety Association Inc., Farm Safety Reports, 1979-1982.
2. Office of the Chief Coroner, Ontario Ministry of the Solicitor General.
3. Statistics Canada, Census of Agriculture, Ontario, 1981.

Table 32

Farm Tractor Related Fatalities By District of Ontario and Type of Tractor Involvement, 1979 - 1982

District	Tractor Only		Tractor and Another Implement or Vehicle [1]		Tractor and Objects		All Tractor - Related Fatalities
	Number	Proportion	Number	Proportion	Number	Proportion	
	no.	%	no.	%	no.	%	no.
Southern	7	26.9	16	61.6	3	11.5	26
Western	12	41.4	15	51.7	2	6.9	29
Central	3	16.7	12	66.6	3	16.7	18
Eastern	7	33.3	14	66.7	-	-	21
Northern	3	25.0	6	50.0	3	25.0	12
Ontario	32	30.2	63	59.4	11	10.4	106

Sources: 1. Farm Safety Association Inc., Farm Fatality Reports, 1979-1982.
2. Office of the Chief Coroner, Ontario Ministry of the Solicitor General.

Note: [1] Includes Traffic Accidents

- only a tractor was involved and the accident occurred on the farm
- only a tractor was involved and the accident occurred on a public road
- a tractor and another vehicle or implement were involved and the accident occurred on the farm
- a tractor and an object were involved and the accident occurred on the farm
- a tractor was involved in a traffic accident on a public road.

Twenty-one fatalities involved a tractor only, in the farm environment, and another eleven occurred in similar circumstances on public roads (Table 33). In total, therefore, thirty percent of fatalities involving tractors occurred when a tractor was being used by itself. Tractors in traffic accidents represented 8.5 percent of the total fatalities recorded by the Farm Safety Association, although the Associations data understate tractor accidents on roads.

Fifty-four fatalities (51%) involved a tractor and vehicle or implement. Tractor mounted implements were on tractors involved in nine deaths, another tractor was involved also in another nine deaths, and a wagon in eight fatalities. Plows, trailers and mowers were each associated with three to four fatal accidents. Ten other farm vehicles and implements were associated with fourteen other accidents.

A substantial number of tractors were involved in fatalities and injuries on roads, according to the Ministry of Transportation and Communications. Some of these accidents did not involve motor vehicles but motor vehicles and tractors were involved in some fatalities and many injuries each year (Table 34). In a thirteen year period 1970 to 1982 the number of motor vehicles — tractor accidents resulting in personal injury ranged from a low of 59 in 1970 to 101 in two years (1972 and 1975). The number of people injured in accidents ranged from 100 in 1982 to 175 in 1975. No particular trend was evident. There was no way to establish how many of the injured were farm people, but, at a minimum, the number probably would be at least one farm person per accident.

Table 33

Farm Tractor Related Fatalities By District of Ontario and Vehicles, Implements, Objects Involved, 1979-1982

Vehicles, Implements and Objects	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Tractor Only- on Farm	3	9	2	4	3	21
- on Road	4	3	1	3	0	11
Sub-total	7	12	3	7	3	32
Tractor and Vehicles and Implements						
Tractor Mounted Implements[1]	1	7	-	-	1	9
Another Tractor	2	1	-	3	3	9
Wagon	4	-	3	1	-	8
Plow	-	1	1	3	-	5
Trailer	-	1	2	1	1	5
Mower	-	1	1	2	-	4
Cultivator, Harrows	1	2	-	-	-	3
Truck, car, on Farm	1	-	1	1	-	3
Manure Spreader	-	2	-	-	-	2
Harvester	1	-	1	-	-	2
Corn Picker	-	-	1	-	-	1
Hayrake	1	-	-	-	-	1
Bulldozer	1	-	-	-	-	1
Woodsplitter	-	-	1	-	-	1
Sub-total	12	15	11	11	5	54
Tractor and Objects[2]	3	2	3	-	3	11
Tractor in Traffic Accidents	4	-	1	3	1	9
Total Fatalities	26	29	18	21	12	106

Sources: [1] Farm Safety Association Inc. Farm Fatality Reports, 1979-1982.

[2] Office of the Chief Coroner, Ontario Ministry of the Solicitor General.

Notes: [1] Includes tractors with scoop, blade, blower, front end loader, back hoe.

[2] Tractor being used to move objects, including logs, trees, posts, stumps, stones.

Table 34

Tractor Involvement in Motor Vehicle Accidents on Roads, Ontario, 1970 -1982

Year	Fatal Accidents Involving Motor Vehicle and Tractor		Personal Injury Accidents Involving Motor Vehicle and Tractor	
	Accidents	Fatalities	Accidents	Personal Injuries
	number	number	number	number
1970	1	1	59	101
1971	1	1	77	109
1972	4	4	101	154
1973	8	8	90	161
1974	3	3	83	120
1975	6	6	101	175
1976	2	2	76	111
1977	6	7	82	136
1978	6	7	85	135
1979	8	10	96	159
1980	5	5	82	125
1981	3	3	68	115
1982	3	3	70	100

Sources: 1. Ontario Ministry of Transportation and Communications, Ontario Motor Vehicle Accident Facts 1970 - 1982.

2. Ontario Ministry of Transportation and Communications.

The number of fatal accidents each year ranged from one to eight, and no trend was evident. As the number of fatalities in each year was usually the same as the number of accidents it was assumed that usually the tractor driver and passengers were the victim(s). In that event it was possible to examine the total number of fatalities and obtain an estimate of ages of farm people killed in motor vehicle - tractor accidents. A total of 60 fatalities resulted from 56 accidents. In the 13 years the age distribution of fatalities was as follows:

5 - 14 years	—	1 fatality
15 - 19 years	—	15 fatalities
20 - 24 years	—	11 fatalities
25 - 34 years	—	7 fatalities
35 - 44 years	—	8 fatalities
45 - 54 years	—	4 fatalities
55 - 64 years	—	6 fatalities
65 years and over	—	8 fatalities
TOTAL		60 fatalities

Forty-three percent of the fatalities were in the 15 to 24 age group.

It was not possible to determine how many of the fatalities or injuries occuring from tractor and motor vehicle accidents were related to agricultural activities.

Fatalities Related to Agriculture - Not Involving Tractors

Seventy fatalities were not associated with tractors (Table 35). These represented 40 percent of the total agriculture related fatalities in the four years. Nine of the seventy deaths were related to silos and grain bins. Water and gas fatalities were almost as large. Trucks and cars were important agents in accidents, both on the farm and on the road. A wide range of farm equipment was associated with the non-tractor accidents, some of them only with one accident in the four years.

Table 35

Farm Non-Tractor Related Fatalities By District of Ontario and Vehicles, Implements, Items Involved, 1979-1982

Vehicles, Implements and Items	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
Silos and Bins	6	-	2	1	-	9
Water and Gas	1	5	1	1	-	8
Truck and Car on Farm	1	4	-	2	-	7
Forage Harvester, Combine and Forage Wagon	1	5	1	-	-	7
Traffic Accidents	2	3	-	1	-	6
Trees, Lumber, Poles	3	1	-	1	-	5
Electricity	5	-	-	-	-	5
Barn	2	2	-	-	-	4
Manure Tank and Cleaner	2	-	1	1	-	4
Swather	-	2	-	-	-	2
Elevator	-	2	-	-	-	2
Fire and Lightning	2	-	-	-	-	2
Animals	1	1	-	-	-	2
Trailer	-	1	-	-	-	1
Forklift	1	-	-	-	-	1
Corn Dryer	-	1	-	-	-	1
Industrial Loader	-	1	-	-	-	1
Tobacco Priming Machine	1	-	-	-	-	1
Gasoline	-	-	1	-	-	1
Front End Loader	1	-	-	-	-	1
Total Fatalities	29	28	6	7	0	70

Sources: 1. Farm Safety Association Inc., Farm Fatality Reports, 1979-1982.
2. Office of the Chief Coroner, Ontario Ministry of the Solicitor General.

There was a regional aspect to the 70 non-tractor related fatalities, as illustrated below:

	Proportion of Fatalities	Proportion of Person-year Equivalents
Southern District	41.4	38.7
Western District	40.0	29.2
Central District	8.6	14.5
Eastern District	10.0	14.1
Northern District	0	3.5
Ontario	100.0	100.0

Proportionate to person-years these deaths were higher in the Southern and Western Districts than in the other three Districts. The Southern District had electricity, fire and lightning and tobacco fatalities that were not recorded in other Districts — as well as a disproportionate number of tree, lumber and pole fatalities. Water and gas fatalities were high in the Western District.

Farm Fatality Rates

The calculation of a fatality rate involves a knowledge of the number of fatalities occurring in a given time period in a specified population. In all jurisdictions there has been dissatisfaction regarding the collection of fatality numbers and uncertainty as to the adequacy of statistics of the related populations. When both fatality numbers and population numbers are suspect any rate calculation derives only a crude estimate. For illustration purposes some fatality rate numbers have been calculated for Ontario agriculture - with a full awareness of the data limitations.

Two types of calculations were made, the first dealt with all accidental and violent fatalities occurring on the farm property, exclusive of the house, and included both agriculture related and non-agriculture related fatalities. The second calculation included only agriculture related fatalities occurring on the farm property, exclusive of the house.

Two population figures were used, the farm population and person-year equivalents. Neither population figure was entirely appropriate. The farm population figure does not include all hired labour, and the person-year equivalents does not include all family members.

Census data were used for farm population figures. The 1959-1960 figure was being estimated from the census of 1956 and 1961. Fatality numbers for all violent and accidental deaths were calculated from The Ontario Farm Accident Survey of 1959-1960 and The Registrar Generals' data of 1979-1982. Fatality figures for 1980 and 1981 were based on an average of the four years 1979-1982 because of significant variation in fatalities from year to year.

Fatality figures for agriculture related accidents were based on the Ontario Farm Accident Survey of 1959-1960 and on the 1979 to 1982 reports of The Farm Safety Association. An estimate of 75 fatalities was derived for 1959-1960 by using table 4 of The Ontario Farm Accident Survey.

Fatality figures for 1980 and 1981 were based on an average of the four years 1979-1982 because of yearly variations. A fatality figure of 38.75 was used for 1980 and 1981 - composed of the fatalities used in the previous analysis plus additional fatalities which were not used in the analysis thus far because of some missing information.

Rate calculations for all violent and accidental deaths on farm property (exclusive of house) were as follows: (using the Ontario Farm Accident Survey and Registrar Generals Data):

- Fatality rate per 100,000 of farm population

$$\text{1959-1960 rate} = \frac{87.00}{575{,}000} = 15.13$$

$$\text{1981 rate} = \frac{68.25}{288{,}743} = 23.64$$

(using average fatalities for 1979-82)

- Fatality rate per 100,000 of person-year equivalents

$$\text{1959-1960 rate} = \frac{87.00}{168{,}610} = 51.60$$

$$\text{1980 rate} = \frac{68.25}{115{,}548} = 59.07$$

(using average fatalities for 1979-82)

The fatality rate per 100,000 population increased in the two decades by 56 percent, as compared to only a 15 percent per 100,000 person-equivalents. The reason for the different rate increase was that the farm population was decreasing faster than the person-year equivalents - number of farmers and unpaid labourers were decreasing faster than hired labourers.

Rate calculations for agriculture related deaths on farm property (exclusive of house) were as follows: (using the Ontario Farm Accident Survey and Farm Safety Association data):

- Fatality rate per 100,000 of farm population

$$\text{1959-1960 rate} = \frac{75.00}{575{,}000} = 13.04$$

$$\text{1981 rate} = \frac{38.75}{288{,}743} = 13.42$$

(using average fatalities for 1979-82)

- Fatality rate per 100,000 of person-year equivalents

$$\text{1959-1960 rate} = \frac{75.00}{168{,}610} = 44.48$$

$$\text{1980 rate} = \frac{38.75}{115{,}548} = 33.54$$

(using average fatalities for 1979-82)

The calculated fatality rate per 100,000 of farm population remained relatively stable whereas a significant drop occurred in the fatality rate per person-year equivalents. However, in reality, these calculations do not take into account the more complete record

of fatalities obtained in the 1959-1960 survey as compared to the 1979-1982 records. The fatality rate per 100,000 of the farm population undoubtedly rose in the two decades, and the explanation is as follows.

The exact rise in the agriculture related fatality rate per 100,000 of the farm population, and the rate situation for person-year equivalents could not be established for two reasons:

1. It was not possible to establish the exact proportion of agriculture related fatalities that had been compiled by The Farm Safety Association in the 1979-1982 period.

2. There was considerable doubt as to the accuracy of the 1959-1960 figure for agriculture related fatalities.

Both of these points were illustrated in a diagramatic presentation of the rate data (Figure 10). In addition to the rate previously calculated two other rates were established. The difference between all violent and accidental deaths and agriculture related deaths was designated, for presentation purposes, as non-agriculture related deaths. The major part of the non-agriculture related deaths was made up of suicides.

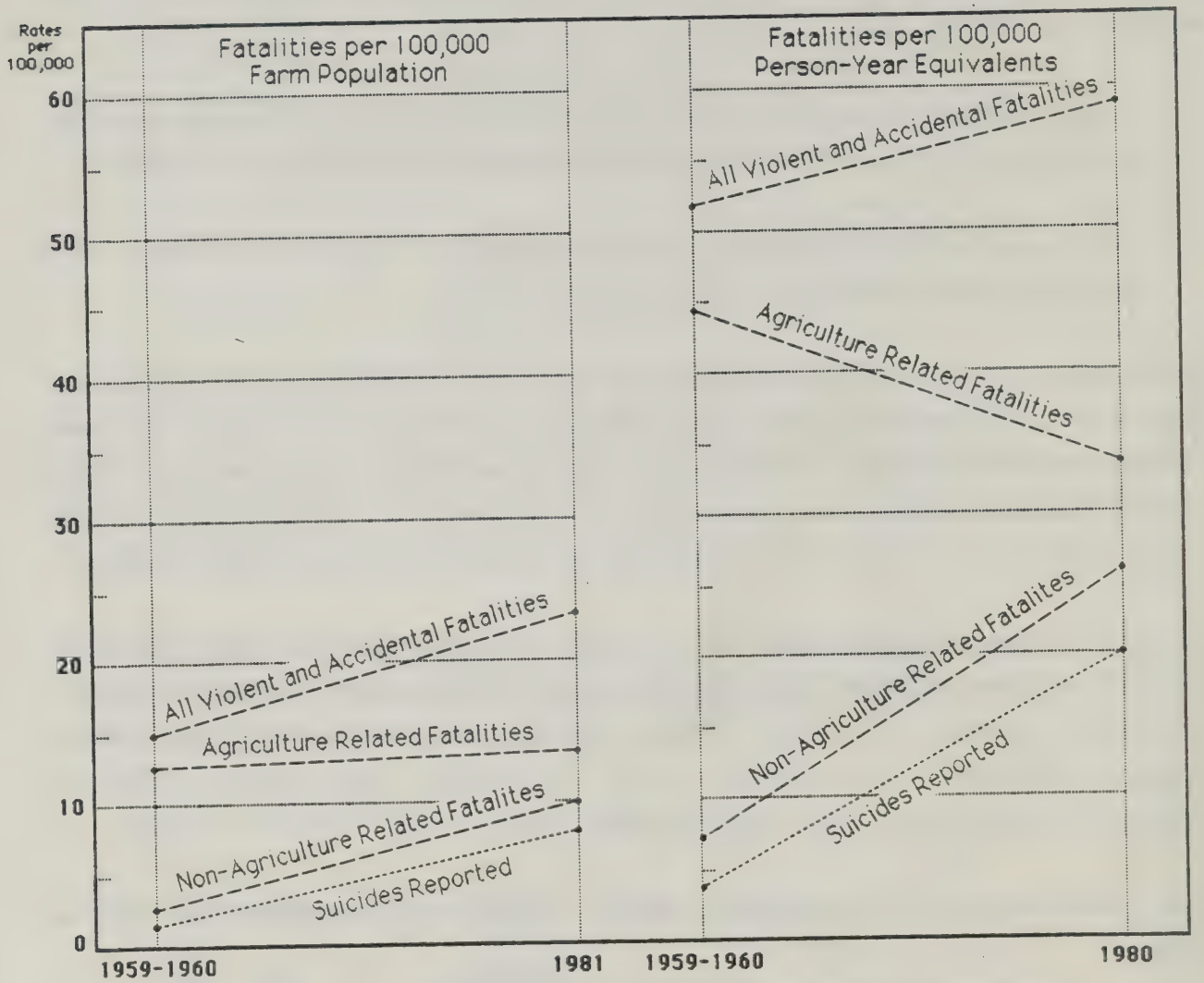
Available evidence suggests that the agriculture related fatalities of 1980 should be higher than shown in Figure 10 as the rate derived from the Farm Safety Association data was a minimum rate. Using fatalities per 100,000 person-year equivalents as an example, agriculture related fatalities could not be raised more than the difference between non agriculture related fatalities and suicides.

The maximum number of agriculture related fatalities was calculated for 1980 as follows:

Total violent and accidental fatalities	68.25
Subtract Farm Safety Agriculture related fatalities	38.75
Result is non agriculture related fatalities	29.50
Subtract suicides	23.75
Result is amount agriculture related fatalities can move up without Impacting on Suicides	5.75
Add Farm Safety Association Agriculture related fatalities	38.75
Result is maximum number agriculture related fatalities	44.50

Figure 10

Fatality Rates For All Violent and Accidental Fatalities, Agriculture Related Fatalities, Violent and Accidental Fatalities Not Agriculture Related, and Suicides, on Farm Property (Excluding House), Ontario, 1959-1960 and 1980, 1981



Sources: Registrar General, Farm Safety Association, Census of Canada, Ontario Farm Accident Survey.

Notes: 1.) Fatalities for 1979-1982 were averaged to obtain rate per 100,000 population in 1980 and rate per 100,000 person-year equivalents in 1981.
2.) Broken line connecting two periods does not imply an even change in rates.

As a minimum the Farm Safety Association would appear to have 87.1% of agriculture related fatalities occurring on the farm property, exclusive of the house ($\frac{38.75}{44.50}$--). However, the exact proportion covered by the Association remained unknown.

The main problem with the 1959-1960 data appeared to be in suicide numbers. The reported suicide rate for 1959-1960 was too low, being only 17 percent of the 1980 rate. Probably some suicides appeared in the agriculture related fatality figures. If so, the agriculture related fatality rate should be lowered. A combination of a lower rate in 1959-1960 and a higher 1980 rate could result in an increase in the agriculture related fatality rate in the two decades per 100,000 person-year equivalents. A slight increase in reported suicides in 1959-1960 and a slight increase in reported fatalities related to agriculture in 1979-1982 would increase the fatality rate.

In summary, the rate of all violent and accidental deaths on farm properties increased from 1959-1960 to 1980 and 1981, whether measured by fatalities per 100,000 of the farm population or per 100,000 person-year equivalents. Agriculture related fatalities on farm properties increased per 100,000 of the farm population and probably increased per 100,000 person-year equivalents.

Farm fatality rate calculations were made for the Districts of Ontario. The measure used was person-year equivalents as this measure was deemed to be better than a rate based on farm population or number of farms. Person-year equivalents was particularly appropriate when examining agriculture related fatalities occurring on the farm property. Fatality numbers used for the analysis by District were the same as used in constructing previous tables (Tables 28 to 35, excluding Table 34).

Fatality rates per 100,000 person-year equivalents by Districts were as follows:

District	Fatality Rate Per 100,000 Person-Year Equivalents		
	On-Farm	Off-Farm	Total
Southern	25.2	5.6	30.8
Western	37.7	4.4	42.2
Central	32.9	3.0	35.9
Eastern	32.2	10.7	42.9
Northern	67.8	6.2	74.0
Ontario	32.5	5.6	38.1

The on-farm rate for Northern Ontario was extremely high. The Southern District had the lowest rate both in total and on-farm.

There were considerable differences among the Districts in the agent related to the accidents. The classification used to analyze accidents was based on the presence of tractors, other machinery without tractors, and accidents not involving machinery. Tractors and other machinery were also added together to obtain a clear separation between machinery and non-machinery fatalities.

Annual fatalities per 100,000 person-year equivalents for machinery and non-machinery related accidents were as follows:

	Machinery Related Fatalities	Non-Machinery Related Fatalities
Southern Ontario	19.6	11.2
Western Ontario	34.1	8.1
Central Ontario	28.4	7.5
Eastern Ontario	36.8	6.1
Northern Ontario	74.0	—
Ontario	29.4	8.7

Seventy-seven percent of agriculture related fatalities were farm machinery type accidents. These accidents were very high in Northern Ontario and substantial in the Eastern and Western Districts. The incidence was quite low in the Southern District. However, the non-machinery accident rate was highest in the Southern District and may not have been a problem in the Northern District.

Within the machinery classification there also were considerable differences in the Districts in rates from accidents involving tractors and accidents involving machines without tractors. The rates were as follows per 100,000 person-year equivalents:

	Tractor Related Fatalities	Machinery Without-Tractor Related Fatalities
Southern Ontario	14.6	5.0
Western Ontario	21.5	12.6
Central Ontario	26.9	1.5
Eastern Ontario	32.2	4.6
Northern Ontario	74.0	—
Ontario	22.9	6.5

The accident rate for the Southern District in both machinery categories was below the provincial average. The Western District rate was high for the machinery without a tractor category.

FARM LOST TIME INJURIES

The Workers' Compensation Board (WCB) provided the Farm Safety Association with lost time injuries data. The Farm Safety Association analyzes this information, along with other information in Association files, and publishes the results each year. The material analyzed "encompasses approximately 99 percent of all lost time injuries reported to the Workers' Compensation Board" each year in the three agricultural rate groups (943,953,876).

Coverage by the Workers' Compensation Board is compulsory for hired labour and is offered on a voluntary basis to employers. However, injuries reported to the Board represent mainly those incurred by hired labour and presently no adequate data exists to determine the lost time injury experience of farmers and unpaid labour. Hired labour injuries were estimated to be 95 percent of total injuries reported to the WCB. This estimate was based on 1983 figures for firms registered with the WCB - broken down into firms with employee coverage only, firms with employer coverage only, and firms with both employer and employee coverage.

The number of firms reporting to the WCB and the number of lost time injuries for 1978 to 1982 were:

Year	Approximate number Firms Reporting	Number Lost Time Injuries
1978	22,000	2,314
1979	22,000	2,200
1980	24,435	2,650
1981	24,500	2,573
1982	25,051	2,472

In any year the number of lost time injuries was about ten percent of the number of firms reporting.

The number of lost time injuries varied from year to year — in the five year period the number of lost time injuries in 1980 was 20 percent higher than in 1979.

The pattern of injuries varied from year to year for most factors examined by the Farm Safety Association. In this report lost time injuries were analyzed for the five year period 1978 to 1982. All injuries data were expressed as totals for the five years and this procedure made it possible to ignore year to year variations.

Published Farm Safety Association information was compiled in a format similar to that used by the Association. However, data columns recorded by the Association as "unknown" were not used for purposes of this report. Seven descriptive tables of data were prepared, setting out lost time injuries data in the following way:

1. District of Ontario and month
2. Farm enterprise and month
3. Farm enterprise and age
4. Farm enterprise and source of injury (e.g. tractor)
5. Farm enterprise and type of injury (e.g. struck)
6. Farm enterprise and nature of injury (e.g. fracture)
7. Farm enterprise and part of body injured (e.g. leg)

The Farm Safety Association's use of the term "farm enterprise" was different from the "farm type" used by Statistics Canada in its classification system. The Association recorded injuries according to the enterprise in which the accident occurred. For example an accident on a combined beef-hog farm would be classed as a pork enterprise accident if the accident happened in the pork enterprise part of the business.

Statistics Canada classified farm types according to the source and size of income. For example the combined beef-hog farm would be classed as a hog farm type if 51 percent or more of the farm income was derived from hog sales.

To compare accident data from the two systems would require an assumption that the farm enterprise classification generally reflected the farm type. There were cases where the two systems were unrelated, as in the case of farm drainage operations which were part of the Association's farm enterprise system, but not part of the Statistics Canada farm type system.

Lost Time Injuries By Month and District

One third of all lost time injuries reported occurred in a two month period, August and September (Table 36). This period was even more crucial in the Southern Ontario District, where 45 percent of the injuries were in these two months. The other four Districts had a much more even experience in monthly injuries, and the peak month for injuries was not in August or September in any of the four Districts. The peak month was July for Western, Eastern and Northern Districts, and June for the Central District.

The Southern District had almost half of the injuries. As an estimated 95 percent of injury claims in Ontario were made on behalf of hired labourers, the amount of hired labour in each District can be compared with injury incidence. The comparisons were:

District	Proportion of Injuries	Proportion of Hired Labour
Southern	49.0	49.1
Western	23.5	24.6
Central	18.1	13.6
Eastern	8.1	10.7
Northern	1.3	2.0
Ontario	100.0	100.0

Injuries appeared to be disproportionately high in the Central District and low in the Eastern and Northern Districts.

Lost Time Injuries By Month and Farm Enterprise

As previously noted total injuries were relatively large in August and September, accounting for one-third of the yearly total. However, this large proportion in the two months was influenced greatly by injuries in one enterprise, tobacco (Table 37). The tobacco enterprise required large amounts of hired labour in the two months and was the second highest enterprise in terms of injuries on a yearly basis. During the year 72.8 percent of tobacco related injuries occurred in August and September. Tobacco enterprise injuries accounted for 46.1 percent of all enterprise injuries that happened in the two months.

Table 36

Number of Lost Time Injuries in a Five Year Period, 1978 to 1982, Ontario, By Month and District

District	Month												Total	
	January	February	March	April	May	June	July	August	September	October	November	December	Number	Pro-portion
	- number -												no.	percent
Southern	164	164	203	248	407	463	533	1623	1006	466	338	174	5789	49.0
Western	146	129	121	180	256	262	335	315	286	326	271	156	2783	23.5
Central	90	83	76	133	236	269	240	263	219	255	168	109	2141	18.1
Eastern	44	40	58	55	80	121	124	111	91	96	77	58	955	8.1
Northern	11	7	8	12	18	14	26	17	10	12	13	9	157	1.3
Ontario - Number	455	423	466	628	997	1129	1258	2329	1612	1155	867	506	11825	
Ontario - Percent	3.9	3.6	3.9	5.3	8.4	9.6	10.6	19.7	13.6	9.8	7.3	4.3		100.0

Source: Farm Safety Association Inc., Survey of Agricultural Lost Time Injuries, Annual, 1978 - 1982.

Table 37

Number of Lost Time Injuries in a Five Year Period, 1978 to 1982, Ontario, by Month and Farm Enterprise

Farm Enterprise	Month												Total	
	January	February	March	April	May	June	July	August	September	October	November	December	Number	Proportion
	- number -												no.	percent
Nursery and Landscape	49	48	49	170	377	374	349	312	244	307	237	69	2585	21.2
Tobacco	20	27	33	42	91	111	137	1210	645	97	95	39	2547	20.9
Fruit and Vegetable	44	39	48	60	102	129	211	244	269	260	97	35	1538	12.6
Mushroom	60	59	47	76	70	67	45	60	87	53	76	70	770	6.3
Greenhouses	40	24	52	59	58	59	56	55	39	40	32	28	542	4.5
Cash Crop	20	12	6	18	24	14	26	36	39	37	18	11	261	2.1
Sub-total	233	209	235	425	722	754	824	1917	1323	794	555	252	8243	67.6
Dairy	90	69	88	69	76	136	149	133	101	90	88	88	1177	9.7
Poultry	60	53	58	46	47	50	44	73	51	73	67	58	680	5.6
Horses	18	25	26	29	46	41	64	49	34	53	19	19	423	3.5
Beef	33	29	39	31	48	47	62	53	39	67	44	37	529	4.4
Pork	18	19	10	16	14	14	25	29	17	10	22	13	207	1.7
Sub-total	219	195	221	191	231	288	344	337	242	293	240	215	3016	24.9
Drainage	7	8	3	10	28	34	42	26	38	39	41	11	287	2.4
Other	19	29	23	26	32	82	100	101	44	66	61	41	624	5.1
Total - Number	478	441	482	652	1013	1158	1310	2381	1647	1192	897	519	12170	
Total - Percent	3.9	3.6	3.9	5.3	8.3	9.5	10.8	19.6	13.5	9.8	7.4	4.3		100.0

Source: Farm Safety Association Inc., Survey of Agricultural Lost Time Injuries, Annual, 1978 - 1982.

In comparison to tobacco other enterprises had a more even seasonal distribution of injuries, although several enterprises (nursery and landscape, fruit and vegetable, cash crop, dairy, horses, beef) had an increase in accidents during the six month period of May to October.

Lost Time Injuries By Age and Farm Enterprise

Three farm enterprises accounted for 53.3 percent of all agricultural injuries reported to the Workers' Compensation Board (Table 38). Nursery and landscape enterprises were first in injuries with tobacco a close second. More than two-thirds of injuries were in the crop enterprises while more than one-quarter were in livestock enterprise. Drainage activities accounted for 2.5 percent of injuries.

One age group, composed of persons from 16 to 25 years of age, were involved in almost half of all injuries. The incidence of injuries decreased steadily through the older age groups. Farm enterprises with a high proportion of injuries in the 16 to 25 age group included horses (61.4%), drainage (60.8%), pork (53.8%), nursery and landscape (52.9%), tobacco (52.6%) and dairy (51.3%).

Lost Time Injuries By Source of Injury and Farm Enterprise

Inanimate objects were involved in one-quarter of all lost time injuries (Table 39). This rate was influenced by injuries in the crop enterprises where 27.9 percent were related to inanimate objects, compared to 19.2 percent in the livestock enterprises. Vegetation accounted for 13.1 percent of total injuries, and was influenced by the 15.9 percent of total injuries in the crop enterprises that were associated with vegetation.

The major source of injuries in the livestock group was animals, accounting for 23.9 percent of all injuries in that group.

Twenty specific sources of injury were identified and the residual was designated as "other" (see Table 39). Ten of the sources could be designated as machinery. In the crop group 26.7 percent of injuries were associated with machinery. The figure for the livestock group also was fairly high — at 23.2 percent. Drainage enterprise injuries connected with machines were 25.5 percent.

Table 38

Number of Lost Time Injuries in a Five Year Period, 1978 to 1982, Ontario, By Age and Farm Enterprise

Farm Enterprise	Age							Total	
	15 and Under	16 - 25	26 - 35	36 - 45	46 - 55	56 - 65	Over 65	Number	Proportion
	- number -							no.	percent
Nursery and Landscape	16	1225	442	264	232	119	16	2314	21.5
Tobacco	114	1098	321	249	201	84	18	2085	19.4
Fruit and Vegetable	43	486	264	217	166	115	36	1327	12.4
Mushroom	10	297	141	146	65	48	6	713	6.6
Greenhouses	6	231	88	73	66	36	9	509	4.7
Cash Crop	8	103	36	26	21	24	5	223	2.1
Sub-Total	197	3440	1292	975	751	426	90	7171	66.7
Dairy	37	542	168	101	110	73	26	1057	9.8
Poultry	7	251	116	107	96	45	3	625	5.8
Horses	3	242	67	32	25	15	10	394	3.7
Beef	15	209	101	54	51	43	9	482	4.5
Pork	1	100	43	24	12	6	0	186	1.7
Sub-Total	63	1344	495	318	294	182	48	2744	25.5
Drainage	3	160	51	24	13	10	2	263	2.5
Other	14	301	93	69	49	33	14	573	5.3
Total - Number	277	5245	1931	1386	1107	651	154	10751	
Total - Percent	2.6	48.8	18.0	12.9	10.3	6.0	1.4		100.0

Source: Farm Safety Association Inc., Survey of Agricultural Lost Time Injuries, Annual, 1978 - 1982.

Table 39

Number of Lost Time Injuries in a Five Year Period, 1978 to 1982, Ontario, By Source of Injury and Farm Enterprise

Farm Enterprise	Source of Injury																					Total	
	Inanimate Object	Vegetation	Other Machinery	Ground or Working Surface	Animal	Weather	Non-Mechanical	Truck	Movement over Exertion	Tractor	Wagon	Primer	Elevator	Ladder	Tobacco	Licensed Vehicle	P.T.O.	Auger	Harvester	Chemical	Other	Number	Proportion
	- number -																					no.	percent
Nursery and Landscape	665	504	380	184	11	70	125	144	75	61	29	-	6	8	-	14	3	5	9	4	187	2484	21.3
Tobacco	674	281	213	214	2	75	31	60	74	74	106	229	43	4	95	12	3	-	12	1	201	2404	20.7
Fruit and Vegetable	372	294	182	80	1	61	103	63	52	57	45	-	11	56	-	6	11	3	12	5	71	1485	12.7
Mushroom	252	69	72	124	0	55	26	17	14	4	8	-	-	16	-	29	-	2	-	-	51	739	6.3
Greenhouses	204	92	27	35	1	23	18	20	28	7	14	-	-	-	-	1	-	-	-	5	48	523	4.5
Cash Crop	34	13	46	18	1	16	6	5	12	19	8	-	7	2	-	3	7	8	11	2	33	251	2.2
Sub-Total	2201	1253	920	655	16	300	309	309	255	222	210	229	67	86	95	65	24	18	44	17	591	7886	67.7
Dairy	172	77	132	82	240	69	29	22	26	46	22	-	29	9	-	4	29	18	11	3	105	1125	9.7
Poultry	201	39	61	53	65	36	26	19	21	11	4	-	4	2	-	2	3	6	-	3	90	646	5.5
Horses	49	27	21	14	245	8	5	4	11	4	11	-	2	-	-	-	-	1	-	-	12	414	3.6
Beef	84	38	81	41	86	16	11	20	6	18	18	-	5	3	-	2	12	10	5	2	55	513	4.4
Pork	49	8	24	17	55	4	13	0	2	-	1	-	1	1	-	-	3	6	-	-	15	199	1.7
Sub-Total	555	189	319	207	691	133	84	65	66	79	56	-	41	15	-	8	47	41	16	8	277	2897	24.9
Drainage	100	10	42	23	0	13	13	8	9	5	8	-	2	-	-	2	-	1	-	1	30	267	2.3
Other	143	72	106	40	13	17	22	20	8	26	19	-	12	1	-	5	9	10	4	1	64	592	5.1
Total - Number	2999	1524	1387	925	720	463	428	402	338	332	293	229	122	102	95	80	80	70	64	27	962	11642	
Total - Percent	25.8	13.1	11.9	8.0	6.2	4.0	3.7	3.5	2.9	2.8	2.5	2.0	1.0	.9	.8	.7	.7	.6	.5	.2	8.2		100.0

Source: Farm Safety Association Inc., Survey of Agricultural Lost Time Injuries, Annual, 1978 - 1982.

Lost Time Injuries By Type of Injury and Farm Enterprise

One-quarter of lost time injuries happened when a person was struck by or against an object (Table 40). Accidents caused by lifting were second highest (19.0 percent), and slips or trips were in third place, just ahead of accidents caused by falls.

Animal injuries were concentrated very highly in the dairy and horse enterprises. Poisonous plants and tobacco type injuries were concentrated (73.7%) in the tobacco enterprise. The incidence of poisonous fumes and chemical type injuries was high in greenhouses.

Lost Time Injuries By Nature of Injury and Farm Enterprise

Strains, sprains, cuts and bruises accounted for 68.7 percent of all injuries (Table 41). Breaks, fractures and dislocations also made up a significant proportion of the total. None of the other ten classification items were significant in quantity. Major amputations were substantially higher than minor amputations.

The pattern of the nature of injuries was fairly similar in the crop and livestock groups, with the obvious exception that tobacco rash occurred only in the crop group.

Lost Time Injuries By Part of Body Injured and Farm Enterprise

Almost one-quarter of lost time injuries involved hands and fingers (Table 42). Back and spine injuries also were high, accounting for 17.6 percent of total injuries. Feet and ankles were 14.3 percent. The proportion of total injuries involving extremeties (hands, fingers, feet, ankles) was 37.7 percent, compared to 21.6 percent for legs, knees, arms and shoulders.

Differences between the crop and livestock groups as to part of the body injured were not large. Proportionately crop injuries affecting the back and spine were more numerous than in the animal group, while leg and knee injuries were higher in the animal group.

Table 40

Number of Lost Time Injuries in a Five Year Period, 1978 - 1982, Ontario, By Type of Injury and Farm Enterprise

Farm Enterprise	Type of Injury												Total	
	Struck By or Against Object	Lifting	Slip or Trip	Fall	By or In Machine	By Animals	Caught Between or In Objects	By or In Licensed Vehicle	Tobacco/ Other Poisonous Plants	Poisonous Fumes Chemicals	Repetitive Movement or Over Exertion	Electrical Current	Number	Proportion
	- number -												no.	percent
Nursery and Landscape	707	655	357	163	277	6	106	72	24	24	41	1	2433	21.2
Tobacco	542	468	263	344	356	5	111	60	154	4	46	4	2357	20.5
Fruit and Vegetable	356	259	164	354	195	1	61	33	10	17	17	—	1467	12.8
Mushroom	185	74	197	169	36	—	36	32	1	5	1	3	739	6.4
Greenhouses	189	125	85	37	19	1	14	11	5	23	8	—	517	4.5
Cash Crop	68	27	23	35	62	1	15	7	—	2	4	1	245	2.1
Sub-Total	2047	1608	1089	1102	945	14	343	215	194	75	117	9	7758	675
Dairy	222	136	163	122	188	210	37	20	—	11	8	2	1119	9.8
Poultry	188	161	101	55	49	13	35	11	5	10	10	—	638	5.6
Horses	50	50	28	29	14	219	15	2	—	1	3	—	411	3.6
Beef	114	65	72	55	79	68	31	12	2	6	—	—	504	4.4
Pork	50	28	25	14	26	38	14	—	—	3	1	—	199	1.7
Sub-Total	624	440	389	275	356	548	132	45	7	31	22	2	2871	25.1
Drainage	99	44	31	31	23	—	22	6	3	2	1	—	262	2.3
Other	196	94	49	61	106	10	34	14	5	5	13	1	588	5.1
Total-Number	2966	2186	1558	1469	1430	572	531	280	209	113	153	12	11479	
Total-Percent	25.8	19.0	13.6	12.8	12.5	5.0	4.6	2.4	1.8	1.0	1.3	.2		100.0

Source: Farm Safety Association Inc., Survey of Agricultural Lost Time Injuries, Annual, 1978 - 1982.

Table 41

Number of Lost Time Injuries in a Five Year Period, 1978 to 1982, Ontario, By Nature of Injury and Farm Enterprise

Farm Enterprise	Nature of Injury													Total	
	Strains, Sprains	Cuts, Bruises	Breaks, Fractures Dislocations	Eye Injury	Puncture, Wounds	Infections, Rash	Burns	Major Amputations	Tobacco Rash, Poison	Hernia	Minor Amputations	Gas, Chemicals	Heart Attack	Number	Proportion
	- number -													no.	percent
Nursery and Landscape	987	721	265	146	59	57	39	28	—	26	26	8	—	2362	21.5
Tobacco	802	714	323	41	53	35	46	25	146	35	21	2	1	2244	20.5
Fruit and Vegetable	479	456	230	75	22	37	16	27	—	21	14	13	—	1390	12.7
Mushroom	218	344	50	19	22	7	8	5	—	—	2	2	—	677	6.2
Greenhouses	175	174	52	26	19	26	11	2	—	5	1	12	1	504	4.6
Cash Crop	63	93	48	13	4	2	6	10	—	3	3	1	—	246	2.2
Sub-Total	2724	2502	968	320	179	164	126	97	146	90	67	38	2	7423	67.7
Dairy	305	325	266	31	39	14	9	28	—	17	13	9	3	1059	9.7
Poultry	237	195	58	32	26	14	11	3	—	11	3	3	1	594	5.4
Horses	115	153	86	7	4	5	4	2	—	4	1	—	1	382	3.5
Beef	131	174	111	21	17	4	8	16	—	5	3	2	—	492	4.5
Pork	48	70	32	7	18	4	1	2	—	—	3	2	1	188	1.7
Sub-Total	836	917	553	98	104	41	33	51	—	37	23	16	6	2715	24.8
Drainage	88	94	36	21	4	5	3	1	—	1	—	—	—	253	2.3
Other	155	217	94	16	16	10	14	23	—	3	13	3	3	567	5.2
Total-Number	3803	3730	1651	455	303	220	176	172	146	131	103	57	11	10958	
Total-Percent	34.7	34.0	15.1	4.2	2.8	2.0	1.6	1.6	1.3	1.2	.9	.5	.1		100.0

Source: Farm Safety Association Inc., Survey of Agricultural Lost Time Injuries, Annual, 1978 - 1982.

Table 42

Number of Lost Time Injuries in a Five Year Period, 1978 to 1982, Ontario, By Part of Body and Farm Enterprise

Farm Enterprise	Hands, Fingers	Back, Spine	Feet, Ankles	Legs, Knees	Arms, Shoulders	Multiple	Trunk	Eyes, Nose, Ears	Head, Neck	Internal	Total Number	Total Proportion
	- number -										no.	percent
Nursery and Landscape	565	587	394	277	200	105	122	190	69	35	2544	21.3
Tobacco	640	368	357	283	273	242	147	61	70	42	2483	20.8
Fruit & Vegetable	352	268	201	164	167	103	98	100	33	30	1516	12.7
Mushroom	118	138	94	102	91	83	57	27	46	3	759	6.3
Greenhouses	114	106	77	61	48	44	23	30	18	12	533	4.4
Cash Crop	81	24	40	43	14	8	14	20	8	4	256	2.1
Sub-Total	1870	1491	1163	930	793	585	461	428	244	126	8091	67.6
Dairy	275	145	174	183	100	69	76	63	41	33	1159	9.7
Poultry	161	157	72	54	69	31	26	41	28	16	665	5.6
Horses	66	49	65	73	50	29	41	23	13	6	415	3.5
Beef	121	76	77	83	45	40	30	34	12	6	524	4.4
Pork	65	26	32	29	14	9	9	10	7	5	206	1.7
Sub-Total	688	463	420	422	278	178	182	171	101	66	2969	24.9
Drainage	68	49	48	33	15	15	13	25	12	3	281	2.4
Other	173	107	80	56	55	30	32	36	21	14	604	5.1
Total - Number	2799	2110	1711	1441	1141	808	688	660	378	209	11945	
Total - Percent	23.4	17.6	14.3	12.0	9.6	6.8	5.8	5.5	3.2	1.8		100.0

Source: Farm Safety Association Inc., Survey of Agricultural Lost Time Injuries, Annual, 1978 - 1982.

SUMMARY AND CONCLUSIONS

The purpose of this study was to develop a structural description of Ontario agriculture that could be used by the Ontario Task Force on Health and Safety in Agriculture as an aid to discussions and decisions in the health and safety subject area. Specific objectives included the compiling of information on relevant health and safety factors in a format that fitted in with the industry structure that was developed, and the identification of relationships between health and safety matters, and the farmers, farm population, employment, and types of agriculture across Ontario. Safety aspects (fatalities and lost time injuries) were to receive priority as the more general health aspects could not be included within the context of this study.

Periodically there have been attempts to derive a general structure for agriculture that could be used by governments and others to analyze changes in agriculture, to formulate policy and to operate programs. Inevitably such attempts have foundered on the complexities of the agricultural industry and difficulties in even defining some of the basic parts of the industry — such as farm, farmer, farm population. The result has been that agriculture, and its components, were defined and analyzed in different ways depending on policy intentions and program complexities. The farm tax reduction program, for example, deals with a different part of agriculture than a general information and extension program.

The structure developed for health and safety matters may be of some use in other ways, but it can never be a general purpose structure. The structure developed for health and safety matters was an interrelationship of the land base within farm boundaries, the farm population, employment in farm operations, and the use of machine and chemical technology in farm production. The intent was to provide a simple structure for a complex industry. Generally agriculture was defined as being activities connected with cultivating the soil, producing crops and raising livestock.

Variation in types of farming across Ontario necessitated the inclusion of both types of farming and geographic districts in the structure. Statistical data for 1981 were supplied by Statistics Canada on 22 farm types in the five districts of Ontario (see Figure 1 for the District Map). This material, in conjunction with more general historical census material, formed the basis for developing a descriptive structure for Ontario agriculture.

Recent Trends in Ontario Agriculture

The number of farmers decreased 32.0 percent from 1961 to 1981 while the farm population dropped by 44.9 percent, as the average size of the farm household decreased by 19.0 percent. The proportion of farmers hiring labour in 1981 was 41.3 percent compared to 43.2 percent in 1961. More farmers reported seasonal hired labour (32.5 percent) than year round hired labour (13.0 percent).

Four components of employment were examined, employers of labour, farmers without hired labour, hired labourers and unpaid family workers. The most stable component in recent years was the employer group, while farmers who did not employ hired labour declined in numbers until the mid 1970's and remained relatively stable thereafter. The number of unpaid workers declined throughout most of the last twenty years. The number of paid workers moved upward substantially, the increase in paid workers (25,000) being offset by the decrease in farmers who did not hire labour (19,000) and unpaid workers (9,000).

The female proportion of employed people in agriculture went from about 16 percent to 33 percent. Female workers made up over half of the total of paid and unpaid workers.

The total labour utilized on Ontario farms was calculated in terms of person-year equivalents and the total was composed of:

- the number of person-year equivalents of farmer's time spent working on their own farms
- the number of person-year equivalents of hired labour
- the number of person-year equivalents of unpaid family labour

Labour inputs decreased from 1960 to 1980 by 31.5 percent. The rate of decrease in person-year equivalents for components of agricultural employment was as follows:

- farmers labour on own farm - 38.7 percent
- unpaid family labour - 33.3 percent
- hired labour - 10.4 percent

Farmers labour on their own farms made up 58.5 percent of total person-year equivalents in 1960 and 52.3 percent in 1980. Unpaid labour dropped slightly, from 19.6 to 19.0 percent. The proportion of hired labour increased from 21.9 percent to 28.7 percent.

Farm output increased 52 percent from 1961 to 1981 despite fewer farms and a reduction in person-year equivalents.[7] Mechanization and application of chemicals were two primary agents in accomplishing this increase in output.

Mechanization on Ontario farms was at a very high rate in the 1950's and continued in the next two decades albeit at a slower rate. The total number of six machines (forage harvesters, balers, trucks, tractors, grain combines, automobiles) enumerated in the census increased 13.9 percent from 1961 to 1981. The increase in five of the six machines (excluding automobiles) was 34.6 percent in the 20 years. During the same period the number of person-year equivalents decreased by 31.5 percent. The trend to more machines occurred at the same time as numbers of farms and farm population decreased — resulting in an increase in the ratio of machines to people.

The increase in machines per 100 farm people was 89.7 percent in only 20 years. Tractors, associated with a high proportion of farm accidents rose in relation to farm people by 97.9 percent. This increase in the exposure of farm people to the hazards of farm machines was signficant. Even in the case of cars there was a rise in exposure by 46.2 percent despite a drop in total number of cars on farms.

Chemical use increased greatly after World War II. An increased awareness developed in the 1970's as to the health hazards to humans and some chemical products were removed from the market. The rise in public concern led to greater efforts to obtain information about chemical use on farms. Census data increased and special studies were carried out.

By 1980 the proportion of farmers spraying or dusting had risen to 61.7 percent and in the Southern District it was 78.9 percent. Two-thirds of expenditures for chemicals were in that District. Expenditures on grain, corn and tobacco type farms were relatively high, but were important also for dairy, small grain, cattle, fruit and vegetables.

Farmer reliance on paid labour was higher in the Southern District than in the other four Districts.

Thirty-eight percent of all Ontario farmers reporting hired labour were in that District. These producers used more seasonal labour than year round hired labour. In contrast all other Districts used more year round hired labour. On balance, Ontario's use of the two types of labour was about the same.

Field crop type farms were the most numerous employers of hired labour in the Southern District but were not prominent elsewhere. Horticultural type farms were very signficant employers in the Southern District also, accounting for two-thirds of Ontario's horticultural employers.

Animal type farms were important purchasers of labour in all Districts, and 62 percent of all farms hiring labour were animal type farms. However, the amount of labour hired by various farm types gave a different perspective. In terms of person-year equivalents of hired labour the dairy operations were very prominent, followed by tobacco producers. Large quantities of paid labour were found in all horticultural farm types. Animal type farms had 44.2 percent of all paid labour, field crop farms 22.9 percent and horticultural operations 27.7 percent.

Sources of labour varied from District to District. The Southern District was alone in a reliance on a large hired labour force. Hired and unpaid labour have been of relatively equal importance in the Western and Central Districts, but recently hired labour has become more important than family labour. Hired labour became as large as family labour, for the first time, in 1980 in the Eastern District. Hired labour remained lower than family labour in the Northern District.

The proportion of Ontario's labour from the three sources in 1980 was 52.3 percent from the farm operator on his own farm, 19.0 percent from unpaid labour and 28.7 percent from paid labour. Paid labour was extremely important to tobacco, greenhouse, fruit, vegetable, and poultry operations. These farm types used paid labour for 45 to 63 percent of their total labour requirements. Cattle, grain, corn, and hog farmers relied more on their own labour and unpaid labour.

One structural difference between Districts was in the degree of reliance on animal or crop type farms. Only in the Southern District was there a clear preference for crop type farms - field crop farms predominating and horticultural type farms also were important. Animal type farms were predominant in other Districts.

Fatalities In The Farm Population

Fatalities occurring in the farm population were partly related to agricultural activities, but many were not. The records of the Registrar General provided a summary of accidental and violent deaths that occurred on the farm property, exclusive of the house. These records contain both agriculturally related and other deaths.

Male deaths of an accidental and violent nature were 91.6 percent of total deaths of 250 over the four year period from 1979 to 1982. Female fatalities were proportionately high in the under 15 age group, accounting for 21.7 percent of all accidental and violent female deaths. Three of the five female deaths in that age group were related to farm machinery, and two of the four fatalities in the 30 to 34 age group were connected to farm machinery.

Twenty-eight percent of male fatalities were in age groups under 25 years of age. The 70 male deaths under 25 years of age were dominated by two main agents, suicides (21) and farm machinery (20). Suicides were involved in 34.8 percent of all accidental and violent deaths and farm machinery in 30.4 percent. Together suicides and farm machinery related fatalities accounted for a majority of fatalities in all but two age groups. Suicide deaths were predominant in seven of the eleven age groups from 20 upward, while machinery related deaths were prevalent in the under 20 age group.

An examination of agriculturally related fatality data for four years (mainly Farm Safety Association material) led to the following observations:

1. A large proportion (50%) of farm fatalities were concentrated into the three months of May, August and November.

2. Annual variations in fatalities were wide in each of the five Districts during the four years 1979 to 1982, and also varied substantially for the province. This implies that a meaningful analysis of farm safety data required consistent information for several years and that extreme care was necessary when examining data for any indication of a trend.

3. Seventy-seven percent of the fatalities were associated with farm machinery. This figure included the 106 fatalities that were tractor related and 30 fatalities associated with pieces of farm machinery not connected to a tractor. These 30 fatalities were distributed very unevenly by District, 19 of them being in the Western District. There was no obvious explanation for the predominance of the Western District in this type of accident. Truck and car accidents on and off the farm accounted for seven fatalities and several pieces of harvesting equipment for 10 deaths.

4. Approximately 60 percent of fatalities were associated with farm tractors in some way. Approximately 30 percent of these tractor related fatalities involved a tractor only, a tractor and another implement or vehicle were involved in 59 percent, and ten percent occurred when moving objects. Tractor only fatalities were relatively high in the Western District and tractor and object deaths were relatively high in the Northern and Central Districts.

5. Forty percent of fatalities were not associated with tractors. Many deaths were associated with silos, grain bins, water and gas, trucks and cars, harvesting equipment and traffic. There was a regional aspect to these accidents as the Southern District had electricity, fire and lightning, and tobacco related fatalities that were not recorded in other Districts, as well as a disproportionate number of tree, lumber and pole fatalities. Water and gas fatalities were high in the Western District.

6. One-quarter of deaths were in the under 20 years of age group, and this percentage applied to both tractor and non-tractor related accidents. Fatal accidents were not as common to people in their twenties as to those in other age groups. The pattern of fatalities in the various age groups was similar for both tractor and non-tractor accidents.

7. An examination of motor vehicle-tractor fatalities in a thirteen year period from 1970 to 1982 identified 60 fatalities, an average of 4.6 per year. Forty-three percent of these fatalities were in the 15 to 24 age group.

Farm Fatality Rates

Two types of calculations were made for fatalities. Both calculations were made with an awareness of the problems inherent in fatality statistics and in a determination of the appropriate population.

The first calculation dealt with fatalities occurring on the farm property (exclusive of the house) and included fatalities related to agricultural and non-agricultural activities. Data were available for the 1959-1960 year and the four year period 1979-1982. The estimated fatality rate per 100,000 of the farm population rose from 15.1 to 23.2, an increase of 56 percent. The increase in the fatality rate per 100,000 person-year equivalents was from 51.6 to 59.1, an increase of 15 percent.

The second calculation was on agriculturally related fatalities on the farm property (exclusive of the house). Despite problems with the data it was possible to establish that the rate of these fatalities increased per 100,000 of the farm population and probably increased per 100,000 person-year equivalents.

Agriculturally related fatalities, both on and off farm were used to derive fatality rates by District and agent involved in accidents. Some results were:

1. The fatality rate per 100,000 person-year equivalents was extremely high for Northern Ontario (74) and the Southern District had the lowest fatality rate (31).

2. The accident rate per 100,000 person-year equivalents for machinery related fatalities was very high in Northern Ontario and substantial in Eastern and Western Districts. The rate was low in the Southern District. The non-machinery rate was highest in the Southern District and may not have been a problem in the Northern District.

3. There were considerable differences in the Districts in rates from accidents involving tractors and those involving machines without tractors. The fatality rate for the Southern District in both machine categories was below the provincial average. The Western District rate was high for the machinery without a tractor category.

Lost Time Injuries

The information available on lost time injuries was the data published by the Farm Safety Association, encompassing injuries reported to the Workers' Compensation Board.

The following condensed information was derived from an examination of Farm Safety Association reports for a five year period, 1978 to 1982.

1. One third of all lost time injuries reported occurred in a two month period, August and September. This period was even more crucial in the Southern Ontario District where 45 percent of injuries were in the two months. The other four Districts had a much more even experience in monthly injuries and the peak month for injuries was not in August or September in any of these Districts. The Southern District had almost half of the injuries. The large amounts of hired labour required by tobacco producers in August and September influenced the monthly pattern of injuries in the Southern District and also accounted for the large number of injuries in the District.

2. As an estimated 95 percent or more of injury claims were made on behalf of hired employees, the amount of hired labour in a district could be compared to the number of injuries in that District. Injuries appeared to be disproportionately high in the Central District and low in the Eastern and Northern Districts. The Southern District had 49 percent of the injuries and of hired labour and therefore appeared to have an average injury experience.

3. Three enterprises accounted for 53.3 percent of all injuries reported to the WCB. Nursery and landscape enterprises were first in injuries with tobacco a close second. More than two thirds of injuries were in crop enterprises while more than one quarter were in livestock enterprises.

4. One age group, composed of persons from 16 to 25 years of age, was involved in almost half of all injuries. Enterprises with a high proportion of injuries in that age group included horses (61.4%), drainage (60.8%), pork (53.8%), nursery and landscape (52.9%), tobacco (52.6%) and dairy (51.3%).

5. The source of injury varied by enterprise. Approximately 28 percent of injuries in crop enterprises were related to inanimate objects compared to 19 percent in livestock enterprises. The major source of injuries in the livestock group was

animals, accounting for 24 percent of injuries in that group. Twenty-three percent of injuries in the livestock group were associated with machinery, as compared to 27 percent in the crop group.

6. The type of injury was also related strongly to enterprises. Animal injuries were concentrated in dairy and horse enterprises. Poisonous plants and tobacco type injuries were concentrated (73.7%) in tobacco enterprises. Poisonous fumes and chemical type injuries were high in greenhouses.

7. The pattern of the nature of injuries was fairly similar in the crop and livestock group, with the obvious exception that tobacco rash occurred only in the crop group. Strains, sprains, cuts and bruises accounted for 69 percent of all injuries.

8. Differences between crop and livestock enterprises as to part of the body injured were not large. Proportionately crop injuries affecting the back and spine were more numerous than in the animal group, while leg and knee injuries were higher in the animal group.

9. It was not possible to develop a definite assessment of the lost time injuries situation for all of Ontario agriculture, including farmers, paid workers and unpaid labour. The dominance of data on paid workers in the WCB data makes this information inadequate as a guide for lost time injuries for farmers and unpaid workers.

Implications

Some implications of the study were:

1. Knowledge could be derived about accidents by the use of published material and data in administration files. However, information from one source usually could not be correlated readily with data from other sources. This was because the purpose of collecting data was different in each agency and uniformity was lacking in the process of collecting, coding and analyzing the data. In addition, there was the problem of relating accident data to a complex agricultural industry - an industry complex in terms of topographical and geographic features, resources used and output mix, and also in the fact that a farm was both a place of business and a place to live.

2. Any study of health and safety in agriculture has to relate occurrences of accidents and health problems to a population that was exposed to hazards. Generally in North America, data were inadequate to identify unambiguously the population or populations exposed to hazards or to count accident and health occurrences associated with such population or populations. In recent years the Farm Safety Association has made a start on providing more detailed information for Ontario.

   An ideal system would require detailed and specific accident and health information that could be related to types of farms, farm enterprises, Districts of Ontario, components of the population, key characteristics of the population, and farm technology. Much of the necessary information resides in various organizations within the Federal and Ontario governments and in organizations concerned with farm health and safety matters. Any major improvement in health and accident information would require a concerted and integrated effort to move towards the ideal system.

3. Inadequate data and changes in the composition of the farm population, farm labour force, and employment in agriculture, made it difficult to establish the population or populations exposed to risk, and therefore decreased confidence in accident rates. The person-year equivalents measure probably was the best measure and could be used as a population basis for further specific studies. Eventually it might be used as a population measure when evaluating accidents over time.

4. A better statistical system would be helpful in efforts to assess the accident situation at any point in time in relation to historical data. However, a more complete understanding of causes of accidents, and the nature of health problems, required specific studies designated to identify factors related to accidents and health problems. The general statistics would assist in indicating possible areas for investigation, and would provide a statistical universe to allow improved interpretation of results.

5. Some data in this report verified points made many times before, including the incidence of accidents as related to age, sex, seasons, tractors, other machinery, and farm enterprises. In addition, the anaylsis of fatality data gave results indicating the possibility of substantial variation by Districts. Undoubtedlly there was a strong relationship between a District, as a factor, and the factor of farm type or farm enterprise. This would be because some enterprises were mainly in one District. However, the question remains whether there might not be a variation in an enterprise by Districts. If so, then another factor like topography, weather, or technology used might be important.

6. There was evidence that fatality rates for all accidents and violent deaths on farms increased substantially during the period 1959-1960 to 1980. This increase probably was related to a very large increase in farm machinery numbers per farm. Agriculture related fatalities likely increased, but at a smaller rate.

   A United States Department of Agriculture report concluded that United States accident fatalities and accident fatality rates were declining[8]. This conclusion was questioned on the grounds that there was no credible source of data on the farm population, and that inconsistencies existed in reporting, classifying, and analyzing fatality data[9].

7. The Ontario study of 1959-1960 revealed that a large number of accidental and violent deaths involved the farm population and that agriculturally related fatalities were a small proportion of the total (Table 1).

8. The changes in the farm population and farm employment, and in farm machinery, since 1961 have important implications for farm safety. More machinery and a reduction in numbers of people exposed to hazards (on a person-year equivalents basis) probably resulted in an increased fatality rate in the last two decades.

9. Machinery was being substituted for people until the mid 1970's. At that point machinery numbers appeared to level off and hired labour began to increase. A substantial and prolonged increase in hired labour would focus more attention on farm health and safety matters. This increase in hired labour is likely to happen as employers of farm labour expand operations to utilize more fully the technology available. Employers of hired labour may not increase in numbers but the average amount hired per commercial farm will increase.

APPENDIX

Appendix Table 1

Number of Ontario Farmers Reporting Paid Labour By Number of Weeks and District - 1980

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number farmers -			
Number Weeks Paid Labour						
1 - 4 Weeks	2,775	3,021	1,478	1,285	353	8,912
5 - 8 Weeks	1,467	1,254	655	798	213	4,387
9 - 12 Weeks	971	942	487	559	142	3,101
13 - 16 Weeks	557	470	233	285	62	1,607
17 - 21 Weeks	626	436	268	283	66	1,679
22 - 26 Weeks	494	325	200	222	53	1,294
27 - 38 Weeks	744	458	267	282	39	1,790
39 - 52 Weeks	1,355	1,175	565	708	124	3,927
53 Weeks and over	3,999	1,497	922	751	157	7,326
Total	12,988	9,578	5,075	5,173	1,209	34,023

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Appendix Table 2

Number of Ontario Farmers Reporting Seasonal and Year Round Paid Labour, By Number of Weeks and District - 1980

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number farmers -			
Number Weeks Seasonal Labour						
1 week	616	790	395	255	96	2,152
2 weeks	787	835	432	346	82	2,482
3 - 4 weeks	1,208	1,073	608	572	153	3,614
5 - 8 weeks	1,451	1,255	651	768	195	4,320
9 - 12 weeks	989	943	503	590	143	3,168
13 - 16 weeks	562	468	237	290	58	1,615
17 - 21 weeks	621	436	277	299	71	1,704
22 - 26 weeks	461	303	207	223	51	1,245
27 - 38 weeks	674	385	250	244	35	1,588
39 - 52 weeks	584	276	187	144	33	1,224
53 weeks and over	2,830	380	323	126	41	3,700
Total	10,783	7,144	4,070	3,857	958	26,812
Number Weeks Year Round Labour						
1 - 38 weeks	1,076	1,152	512	598	134	3,472
39 - 52 weeks	1,363	1,416	726	888	150	4,543
53 weeks and over	1,043	818	412	362	72	2,707
Total	3,482	3,386	1,650	1,848	356	10,722

Source: Statistics Canada, Census of Agriculture, Ontario 1981

Appendix Table 3

Number of Ontario Farmers Reporting Off-Farm Agricultural Work, By Number of Weeks and District - 1980

Item	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
Number Days Agricultural Off-Farm Work						
1 - 6 Days	371	476	160	170	79	1,256
7 - 12 Days	293	325	119	107	41	885
13 - 24 Days	330	349	126	105	34	944
25 - 48 Days	417	357	143	131	26	1,074
49 - 72 Days	259	185	84	53	17	598
73 - 96 Days	137	95	42	35	7	316
97 - 126 Days	174	122	72	66	23	457
127 - 156 Days	116	100	43	46	12	317
157 - 228 Days	282	210	93	74	19	678
229 - 365 Days	711	556	208	207	53	1,735
Total	3,090	2,775	1,090	994	311	8,260

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Appendix Table 4

Person-Year Equivalents of Farmers' Work on Own Farm By District of Ontario and Farm Type - 1980

Type of Farm	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Dairy	2,305	3,859	1,921	3,649	626	12,360
Cattle	2,202	6.958	3,099	3,139	989	16,387
Hogs	1,396	1,932	374	288	40	4,030
Poultry	669	604	287	255	82	1,897
Sheep and Goats	140	296	159	153	47	795
Livestock Combination	628	990	271	184	69	2,142
Horse	154	217	189	95	28	683
Other Animal Specialty	121	171	110	76	15	493
Sub-total	7,615	15,027	6,410	7,839	1,896	38,787
Wheat	331	120	103	25	2	581
Small Grain	2,295	1,183	449	370	203	4,500
Oilseed	2,247	39	10	7	1	2,304
Grain Corn	2,351	878	410	250	2	3,891
Forage	155	311	228	292	78	1,064
Dry Field Pea and Bean	45	88	3	-	-	136
Tobacco	2,019	9	50	-	-	2,078
Potato	56	76	36	15	25	208
Field Crop Combination	182	25	15	8	12	242
Sub-total	9,681	2,729	1,304	967	323	15,004
Fruit	1,486	257	237	93	16	2,089
Vegetable	994	276	316	104	31	1,721
Greenhouse Products	581	202	180	99	58	1,120
Nursery	143	92	76	34	16	361
Sub-total	3,204	827	809	330	121	5,291
Other Combination	499	343	266	193	65	1,366
Total	20,999	18,926	8,789	9,329	2,405	60,448

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

Appendix Table 5

Estimated Person-Year Equivalents of Unpaid Labour on Ontario Farms By Districts and Farm Type - 1980

Type of Farm	Southern Ontario	Western Ontario	Central Ontario	Eastern Ontario	Northern Ontario	Ontario
			- number -			
Dairy	656	1,095	559	1,050	183	3,543
Cattle	820	2,492	1,283	1,321	428	6,344
Hogs	484	687	140	112	17	1,440
Poultry	231	223	118	110	47	729
Sheep and Goats	71	150	78	71	25	395
Livestock Combination	208	330	115	90	35	778
Horse	71	95	82	41	12	301
Other Animal Specialty	53	69	43	32	9	206
Sub-total	2,594	5,141	2,418	2,827	756	13,736
Wheat	152	53	45	11	1	262
Small Grain	800	487	190	167	95	1,739
Oilseed	890	16	5	3	1	915
Grain Corn	887	349	176	105	1	1,518
Forage	71	132	105	116	36	460
Dry Field Pea and Bean	19	34	1	-	-	54
Tobacco	586	3	14	-	-	603
Potato	17	24	14	5	13	73
Field Crop Combination	57	10	6	3	6	82
Sub-total	3,479	1,108	556	410	153	5,706
Fruit	602	108	100	41	7	858
Vegetable	353	106	110	38	14	621
Greenhouse Products	192	68	62	32	23	377
Nursery	56	38	30	15	6	145
Sub-total	1,203	320	302	126	50	2,001
Other Combination	190	142	113	80	32	557
Total	7,466	6,711	3,389	3,443	991	22,000

Source: Statistics Canada, Census of Agriculture, Ontario, 1981.

REFERENCES

1. Ontario Department of Agriculture, Ontario Farm Accident Survey, 1960.

2. Farm Safety Association Inc., Annual Report, 1982.

3. Baker, M. H., An Exploratory Inquiry into Farm Accidents/Injuries in Ontario, 1981.

4. Pfeiffer S. et al., Aspects of Physical Fitness and Health in Ontario Dairy Farmers.

5. Ontario Ministry of Agriculture and Food, Pesticides in the Production of Fruits and Vegetables, 1982.

6. Economics Branch, Ontario Ministry of Agriculture and Food, Survey of Pesticide Use in Ontario, 1978.

7. Statistics Canada, Index of Farm Production, 1982.

8. Fritsch, C., and Zimmer, J., U.S. Farm Accident Fatalities, 1970-76, U.S.D.A. 1980.

9. Field, W., Durkes, J., Tormoehlen, R., "Summarization of Indiana's Farm - Related Fatalities, 1970-79", Engineering and Safer Food Machine, American Society of Agricultural Engineers, 1980.

Statistical Data References

1. Statistics Canada, Census of Agriculture, Ontario, 1956, 1961, 1971, 1981.

2. Farm Safety Association Inc., Farm Fatality Reports, 1979-1982.

3. Farm Safety Association Inc., Survey of Agricultural Lost Time Injuries, 1978-1982.

4. Statistics Canada, Labour Force Annual Averages, 1973-1983, 1984.

5. Ontario Ministry of Transportation and Communications, Motor Vehicle Accident Facts, 1970-1982.

Medical Reference For Classification Purposes

1. World Health Organization, International Classification of Diseases, 1975 Revision, Vol. I, Geneva 1977.